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February 1988

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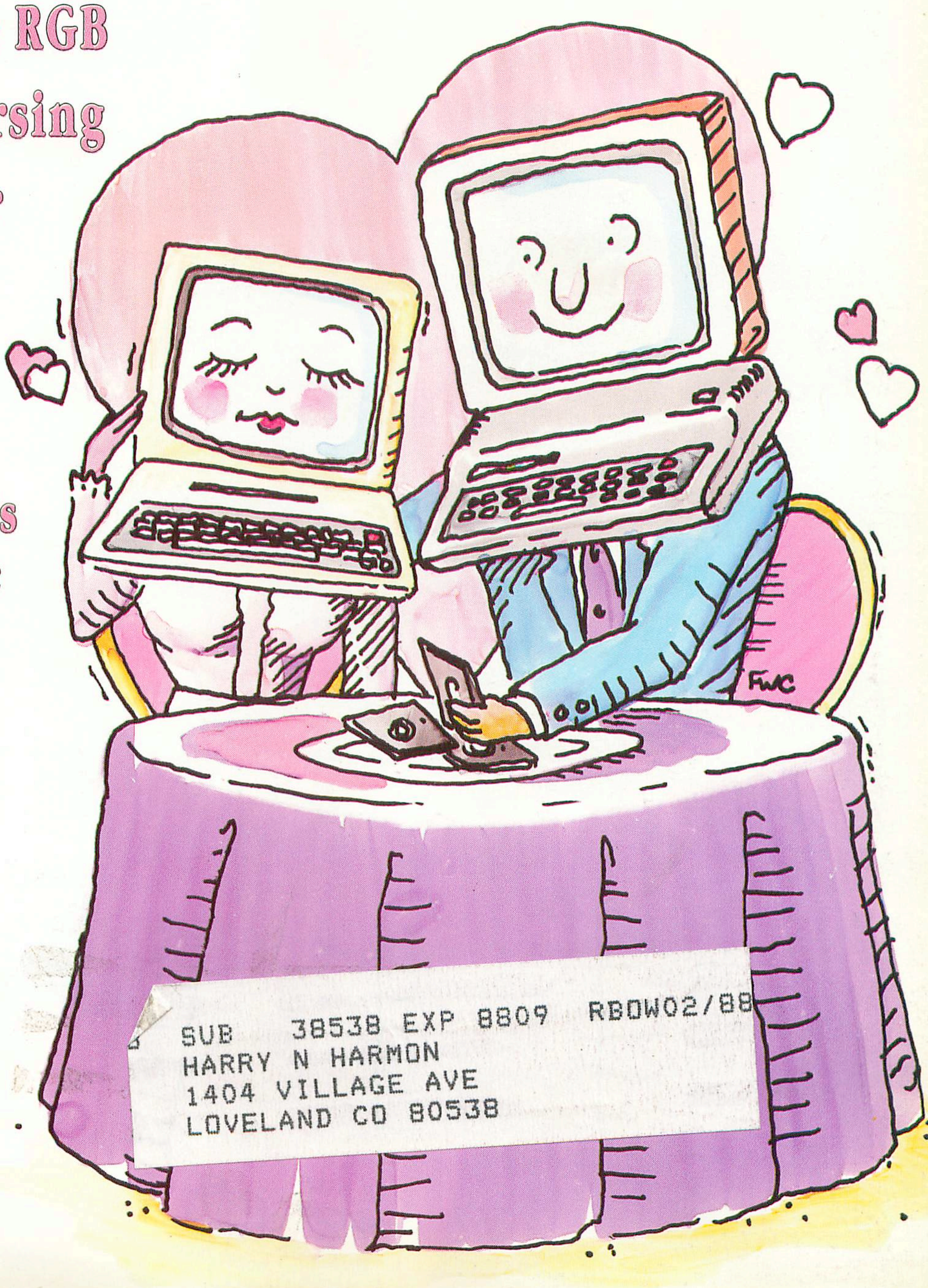

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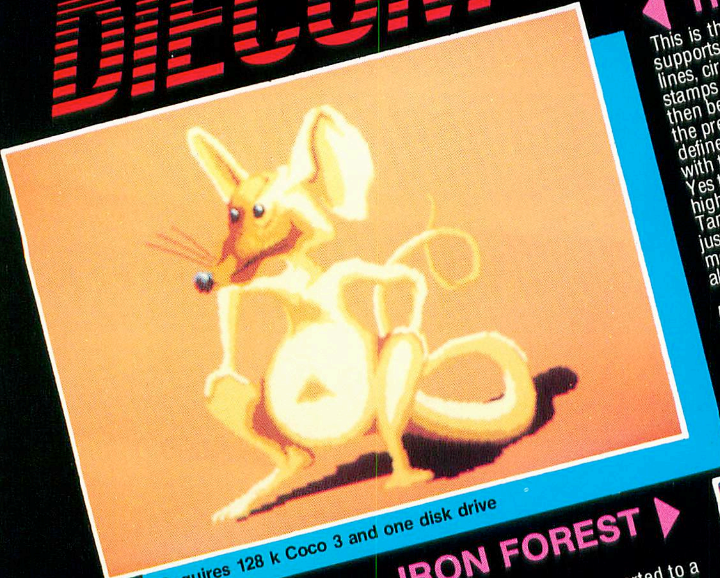

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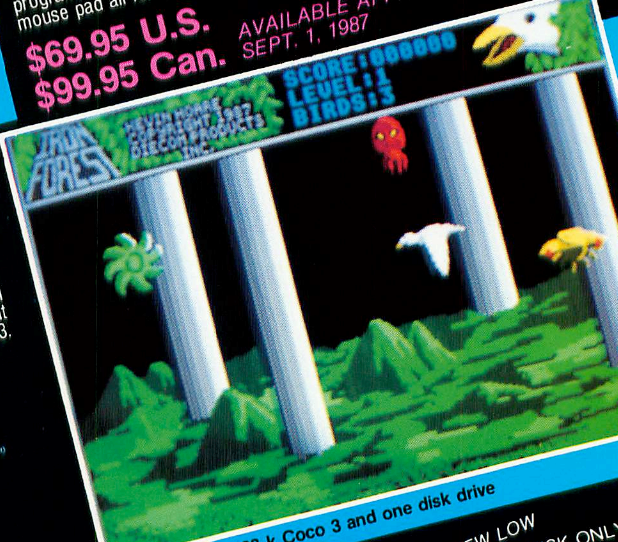

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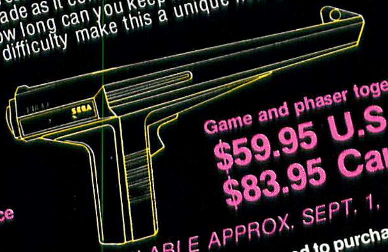

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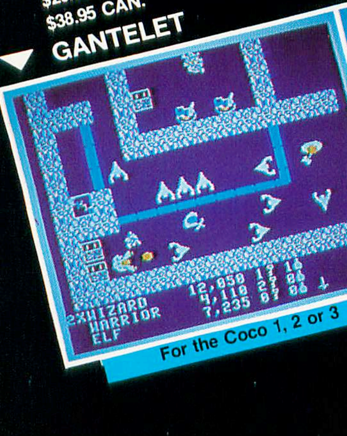

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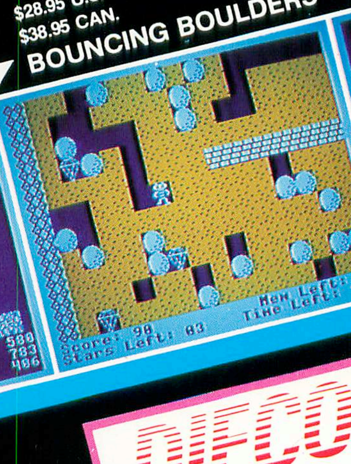

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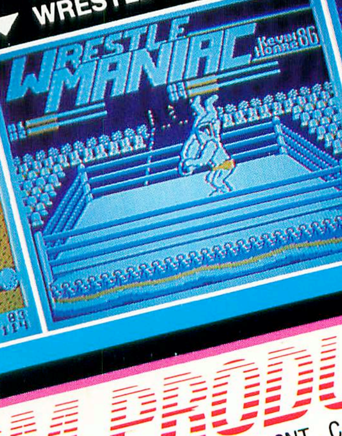

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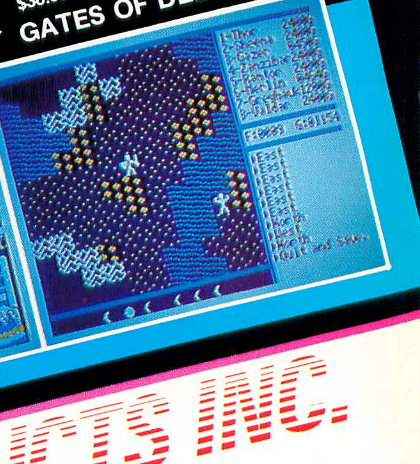

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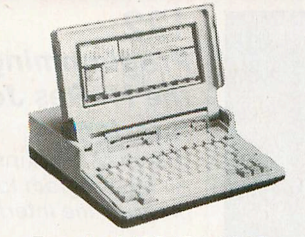

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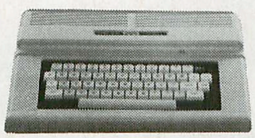

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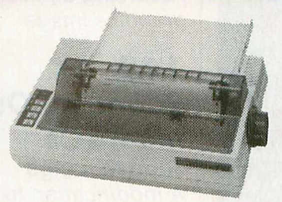

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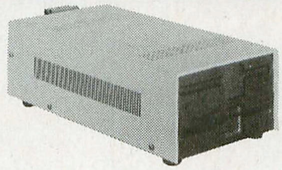

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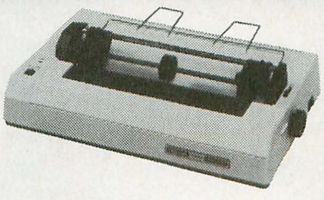

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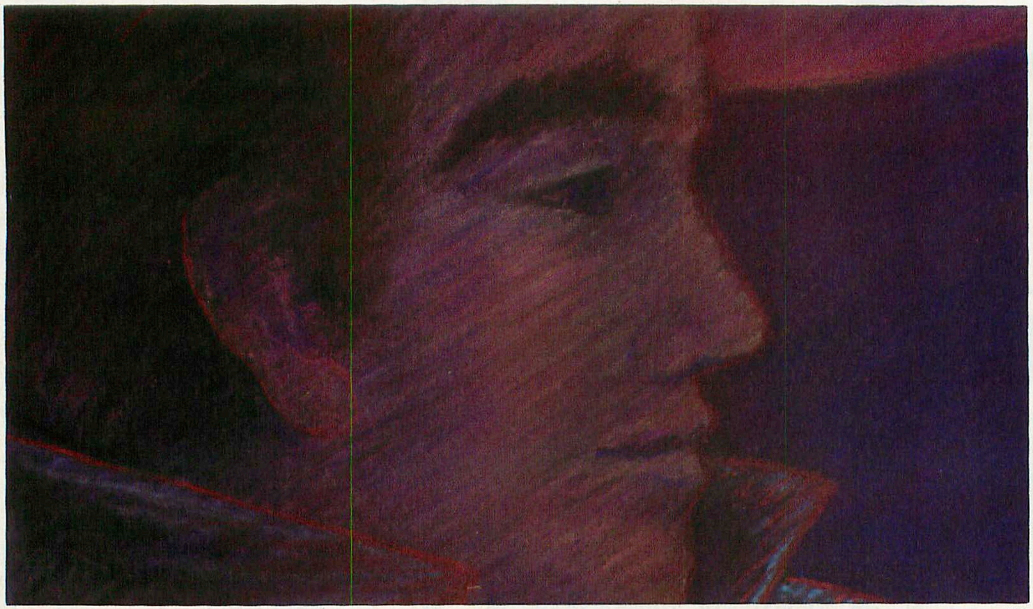

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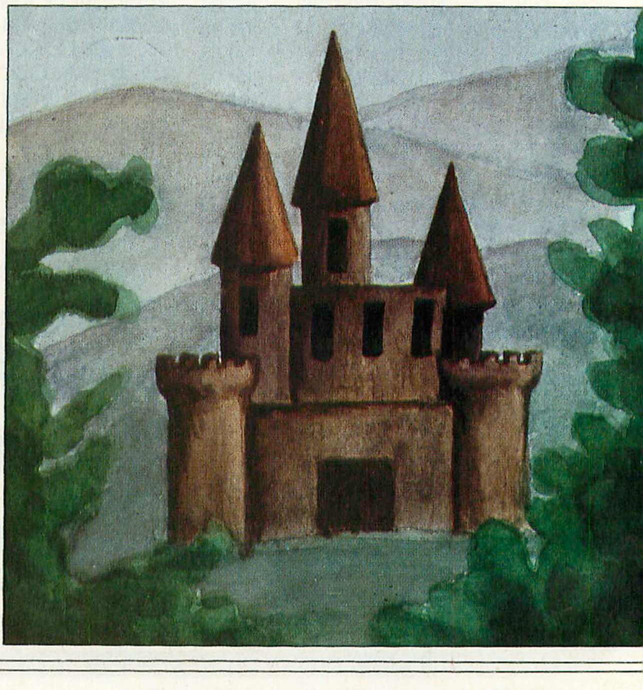

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Letters to the RAINBOW

OS-9 Happenings

Editor:

I have had OS-9 Level II for eight months and got nowhere with it until I bought Dale and Peter's latest opus — then it happened!

It is as if someone turned on a switch in my head! Having bought the book a week ago, I am now going back to the original manual and actually understanding it!

I cannot *stress the importance* of Level II on the CoCo 3 highly enough. I have seen a Hi-Res game and a complex database running concurrently on my $200 box — I can really see what all the excitement is about. Although my experience with computers stretches back to the early days of minicomputers, I have always been a bit of a computer oaf — strictly an "I don't care how it does it" type of person. So, if I can figure Level II out, anyone can.

My brother is a long-time CoCoist (got me interested), but lately he's been thinking about buying MS-DOS. But on my recommendation, he now wants to see some of the new applications under Level II.

A friend of mine bought *Data Master* from Computerware. I got to play with it briefly. At first glance, the program is a great example of the raw speed and power available using Level II and the windowing environment. One thing I loved was the manual — if they can cram everything you need to read into 43 pages, including six pages of index and introduction, it has to be the most user-friendly system I've ever seen. (I am currently saving up the $70 to buy it myself, but have already spent my December computer allowance!)

Ivan Scanlow-Carling
Antioch, TN

The Year's Best

Editor:

Approximately one year ago, I unpacked my CoCo 3 and went into business. Since then, I have subscribed to RAINBOW and RAINBOW ON DISK and have had one solid year of enjoyment. I would like to start the "Program of the Year" contest by selecting my three favorites from 1987.

3rd Runner Up — *DU-3* by Mike Jorgenson, February '87. This program has been transferred to every one of my disks and is a super utility, better than any I could have purchased for $50 and up. Thanks, Mike, for helping us novices.

2nd Runner Up — *Write III* by Bill Cook, April '87. I am writing this letter right now on this word processor galore. Don't have to buy one now, Bill. You could have marketed this baby, but you chose to share it with your fellow CoCoholics! What a guy!

Program of the Year — *City Sun* by Greg Hall, November '87. If there's one thing I can't stand, it's a 13-year-old kid who can write better programs than I can! All joking aside, I still can't believe what this program does. Congratulations, Greg! You have a tremendous future ahead of you, and thanks go to your parents for encouraging your talents.

Bernice M. Shoobs
Clifton, NJ

Positive Reaction?

Editor:

Although I am totally against software piracy, whether it be for profit, trading, or just giving, I have my own views on how the problem might best be handled.

Of the many programs I have purchased, most are in some way copy-protected. However, three of them (including the one I am using to write this letter) are not only unprotected, but come with manuals that encourage the user to make a backup copy and save the original. Cognitec (*Telewriter-64*), Sierra On-Line (*Winnie the Pooh in the Hundred Acre Wood*) and Island Graphics (*Micro Illustrator*) are all to be commended. They obviously trust their customers enough to make it easy for them to ensure the longevity of their purchase. You've got to feel good about dealing with people like this.

I am certain that there are some people who take advantage of these companies, but they would probably steal from the Salvation Army. I couldn't violate this trust and still sleep at night, and I think the vast majority of home computer users feel the same way. Many people in the software business would think I'm naive, but this is not guesswork on my part. It is a considered opinion based on experience.

I work in the car business. Our dealership is rather unique in one surprising respect. We maintain an inventory of some 300 cars and trucks, and they all are kept unlocked with keys in the ignitions all day long. And they are never locked! All night long, and on Sundays (when we are closed) customers can get in the cars, lift the hoods and inspect them all they want. The keys are removed, but no other form of protection is used. Foolish? I don't think so. We experience no more vandalism and theft than any other dealership I have worked in.

Now granted, Maine is not exactly the crime hotbed of the nation. Nevertheless, people are people and we are all subject to temptation. But a surprising number of us react positively when shown that we are trusted.

My message is simple. Assume a little integrity in your customers and let them know it. You just may find it to be the best form of copy protection yet.

Incidentally, RAINBOW's product reviews motivated me to buy all three of these excellent programs, along with several other pieces of software and hardware. Even if there were nothing else of any consequence in your superb magazine, these unbiased, informative reports would in themselves be more than worth the price of the subscription. You haven't steered me wrong yet.

Paul Fullerton
Gardiner, ME

REVIEWING REVIEWS

Editor:

I would like to correct Mr. Augsburg's statement in the October issue in which he reviews *Color Max 3*. He states that the printer support includes "even a version that produces 16-color printouts of the screen on a CGP-220." This is untrue. The CGP-220 Ink Jet Printer has the information contained in its ROM to print a total of seven colors, six of which are produced by the subtractive coloring system, as the manual states. Any two of the colors (yellow, magenta and cyan) can be paired to produce three more colors: red, green and violet. Black, though technically not a color (the absence of all color being black) reflects some light, so in practice qualifies as color Number 7.

The *Color Max 3* software uses a technique called dithering, where colors are "meshed" together but not mixed in order to produce a simulation of a desired color on the CGP-220, not an actual color for color representation. This I was told by a representative of Computize.

I would like to add that I have seen actual CGP-220 color prints made with *Color Max 3* and was very impressed. But will there ever come a time when the CGP-220 is permitted to "grow up," as it were, to fully implement the abilities of this machine? This printer could, with the correct software/hardware, faithfully reproduce any of the 64 colors the CoCo 3 can show on its screen. When will it be realized that this printer can be the perfect mate to the CoCo 3? After all, it is a "color" computer, so don't you think it would be logical to have at its side a "color" printer?

If this issue were left up to Tandy, I would have no hope. But what I do have is pride in a strong CoCo Community that is ready to support its third-party developers. Tandy no longer markets this fine printer even though Canon USA, Inc., still manufactures it as the PJ-1080A Ink Jet Printer. Come on, all you programmers and developers, how about a real challenge . . . or maybe we should just be content and not worry about such a trivial thing as color, and we'll all "upgrade" to a black-and-white CoCo to match our black-and-white printers!

Charles R. Womble
Wilmington, NC

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HINTS AND TIPS

Editor:

To make my *Genealogy* programs [September and October '87 issues] work with a DMP-130 printer, these lines must be modified in the PAGE program: 380, 400, 440, 460, 490, 530, 550, 580, 660, 740, 770, 850, 870, 900 and 980.

These lines must be modified in the FAMILY program: 3780, 3800, 3840, 3860, 3890, 3930, 3950, 3980, 4020, 4040, 4070, 4110, 4130, 4160 and 4200.

The lines will have to changed from `PRINT #-2,CHR$(27);CHR$(90);CHR$(12)` to `PRINT #-2,CHR$(27);CHR$(64);CHR$(24)`.

No lines have to be modified in CHART, as the PRINT commands do not appear.

Brian Le Blanc
Digby County, Nova Scotia

Inexpensive Upgrades

Editor:

I recently read a letter concerning the expense of upgrading a 16K or 32K CoCo 2 to 64K. I became aware that many of your readers are paying large amounts of money to make the upgrade. There is a much cheaper way.

Jameco Electronics, 1355 Shoreway Road, Belmont, CA 94002 (415-592-8097), offers two kits for making the conversion easily and cheaply. Part No. TRS CoCo ($10.00) is for newer CoCos (U14 through U21 are not "the same size.") Older CoCos use the part No. TRS-64K-2 ($8.95). U14 through U21 are "the same size" to use this one.

My machine had eight 8040517 RAM ICs, so I needed the TRS-64K-2 kit. I removed the eight RAMs, put in the ones from Jameco and soldered the W1 jumper into place (it's marked "64K" on the board!), and nothing could be easier. Do use static precautions: Don't stand on a rug while handling the computer or ICs. Ground yourself on the kitchen faucet before touching anything. Don't bend the pins. Touch the tip of the soldering iron to ground before touching the board. Don't touch any ICs unnecessarily. Use a small screwdriver to very gently pry an IC out of its socket.

James English
Kansas City, KS

A New Year

Editor:

Here is a change to the program *New Year* by Carmie A. Thomas [January '87, Page 29]:

```
60 DRAW"BM24,20;S5L2R2D20L4R8B
R10U20L5D5R5BR10U5D20R5U11L5U
10R5D10BR7U10D20R5U11L5U10R5D
10
```

This modification will adapt the 1987 graphics display to 1988.

Shawn Robb
Amarillo, TX

INFORMATION PLEASE

Editor:

I am looking for people willing to exchange software they have written concerning quality control or assurance, and statistics.

I have written several programs in BASIC and have started to convert them to run under BASIC09, using many of the enhancements available to me on the CoCo 3 and OS-9 Level II.

I am hoping to hear from interested readers, especially from those who are members of the American Society for Quality Control.

Charles Blair
5820 Balmoral St.
Brossard, Quebec
Canada J4Z 2H4

CoCo Carrier

Editor:

I deliver papers and am very interested in being able to put my route on my computer. I have to bill my customers once a month, so I need a way to do this. Also, I need to keep track of names and addresses because I need to run this off, and I would like to keep track of the payments as they come in.

We also have a list of customers who pay directly to the office and their expiration dates. Does anyone know of a program to help me?

Sindy Shields
Rt. 6 Box 362
Rocky Mt., VA 24151

KUDOS

Editor:

I have wanted to brush up on statistics for some time, but could not find the right book. At the RAINBOWfest in Princeton, I picked up a copy of *The Rainbow Introductory Guide to Statistics* and the disk that goes with it. Let me say that brushing up has been easy, as the book is well-written, and the program is very good.

Thanks for a job well done.

Douglas F. Woolley, Jr.
GIMLET
Convent Station, NJ

Brush With Celebrities

Editor:

On the few occasions I have gone online with Delphi, I've managed to "bump" into a few of the more notable CoCo users.

While in conference, I have found that these individuals are quite tolerant, courteous and helpful to newcomers — even when the first-time user jumps into the middle of their conversation.

Jim Reed, Don Hutchison, Rick Adams and a host of other contributors deserve all the support and acclaim the CoCo Community can give them.

Charles A. Grossman
CAG
Farmington, NM

PEN PALS

- I am 15 years old and would like a pen pal. I have a CoCo 2, disk drive, CGP-220 Color Ink Jet Printer and joystick.

Kevin Cain
12506 NE 142LN #C203
Kirkland, WA 98034

- Lakeland Communications, International Student Penfriends is the largest student pen pal organization in the world for all students who are 7 to 18 years of age. We have thousands of members who like computers, sports and many other interests! We have monthly pen pal book listings, newsletters and monthly contests. All students 7 to 18 years of age who would like to join may write to us and we will send complete details! Please send a #10 business size SASE to: Lakeland Communications, International Student Penfriends, 7430 Antebellum Blvd., Fort Worth, Indiana 46815.

- I am a 15-year-old looking for a pen pal. I own a 64K CoCo 2, with a cassette recorder.

Sherree Connelly
79 Edna Ave.
Mechanicville, NY 12118

- I am 16 years old and looking for pen pals from anywhere. I have a 64K CoCo 2 with two joysticks, disk drive (RS-DOS), DMP-105 printer and a DMC-3 modem. I have solved *Black Beard's Island*, as well as *Dragon Blade* and a few others. I am most interested in high action arcade games.

Jesse Sanders
P.O. Box 84
Chimney Rock, CO 81127

- I am 14 years old and have a CoCo 3 and two drives, which I use mostly for graphics. I enjoy listening to music, especially Whitesnake and Led Zeppelin. I would like to hear from girls over 14 or guys with the same interests, from anywhere. Will answer all letters.

Greg LeMar
315 Smimer Blvd.
Phillipsburg, NJ 08865

- I am 14 years old and have a CoCo 2 and 3, DMP-105 printer, disk drive, cassette recorder and Speech/Sound Pak. I am mostly interested in Adventures and games. Anyone from anywhere can write.

Marianne Torraco
804 Eagle Street
Utica, NY 13501

- I am 13 years old and have a 64K ECB CoCo 2, disk drive, and a DMP-130 printer. If you want a pen pal, please write me. I'll answer all letters!

Chris Casson
3 Channing Lane
Camillus, NY 13031

- I am 21 years old and I am looking for pen pals who run Color Computer bulletin board systems. I have a CoCo 2, modem, printer, cassette and a disk drive.

John Peavy
1617 Savage Rd. NE
Salem, OR 97301

- I'm interested in writing to and hearing from CoCo addicts from all over the world. I have about 20 pen pals I write to on a continual basis, and I'm always looking for more. I have a CoCo 2, CoCo 3 (just got it!), DMP-130 printer, DCM-5 modem, two disk drives and lots more. All letters will be answered, so please write.

Erick Molnar
P.O. Box 4616
Sparks, NV 89432

- I am a 17-year-old male looking for a pen pal. I have a CoCo 2, a single-sided and a double-sided disk drive, Multi-Pak, tape drive and a DMP-130A printer. Everyone who reads this qualifies. If we don't talk CoCo then we can just talk. I especially enjoy Adventure games. I guarantee all letters will be answered.

Matt Fumich
P.O. Box 1346
Munford, TN 38058

BULLETIN BOARD SYSTEMS

- Call the Grand Rapids BBS Wyoming Pubb, 616-538-8229. The BBS operates under the OS-9 and UNIX operating systems on a CoCo 2 with 512K RAM.

Robert M. Worth, Jr.
1726 Millbank S.E.
Grand Rapids, MI 49508

- Call the best CoCo Board in Reading, Pennsylvania, the Glass Menagerie. We have a System 2 for strictly CoCo downloads and four drives full of programs. Try the best online game section ever! Call 215-376-1819 24 hours, seven days a week. 8/N/1, 300/1200 baud. Run on two CoCo 2s, 10 disk drives! SysOp: Glassy. Co-SysOp: Lewis Brubaker.

Allen H. Cravener
1137 Cotton St.
Reading, PA 19602

- The Dungeon BBS of Newport, North Carolina, is now online running on *Colorama* Version 4.0, featuring games, Hi-Res graphics, multiple message bases, uploads and downloads. Hours of operation: 6 p.m. to 6 a.m. Monday through Friday, 24 hours Saturdays and Sundays. 300 baud, protocol of 8-N-1. Supports all CoCos. Call 919-726-9737.

Chuck Katsekes
410 Scott Drive
Newport, NC 28570

- I would like to inform your readers of two new BBSs that run under new software called *CSBBS*. The programs were written especially for the CoCo 3! Both have screen width settings and multiple message bases, provide support for the whole family of CoCos, and have helpful SysOps. Both have four drives online and operate 24 hours a day at 300/1200 baud, 7/E/1:

Fox Communications 602-846-2002
Dream Weaver 602-848-9902

Charles Pippin
6827 W. Luke
Glendale, AZ 85303

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

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AVAILABLE MEMORY

Unlike most other word processors, Word Power 3 gives you 80K of memory with a 128K CoCo 3 and more than 460K with a 512K CoCo 3 to store text.

TYPING/EDITING

Word Power 3 has one of the most powerful and user-friendly full-screen editors with wordwrap. All you do is type; Word Power 3 takes care of the text arrangement. It even has a built-in **Auto-Save** feature which saves the current text to disk at regular intervals; so you know that your latest version is saved on disk. Here are some of the editing features of Word Power 3:

Auto-repeat; Key-Click; Cursor up, down, left, right, beginning of line, end of line, next word, previous word, top of text, end of text; page forward, backward; 4-way scrolling; block copy, move, delete; global search and replace (with wild-card search); line positioning (left, right or center); insert/overstrike modes; delete to beginning/end of line, next/previous word; and tabs. You can also embed printer codes in text to take advantage of underlining, sub/superscript and other printer functions. Define left, right, top and bottom margins, and page length.

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Ever try mailing out the same letter to 500 different persons? Could be quite a chore. Not with the Mail Merge feature of Word Power 3. Using this feature, you can type a letter, follow it through with a list of addresses and have Word Power 3 print out personalized letters. It's that easy!

LOADING/SAVING FILES TO DISK

Word Power 3 creates ASCII format files which are compatible with almost all terminal, spell-checking, and other word-processing programs. It allows you to load, save and kill files and also to create and edit Basic, Pascal, C and Assembly files. Supports double-sided drives and various drive step rates.

PRINTING

Word Power 3 drives almost any printer (DMP series, EPSON, GEMINI, OKIDATA, etc.). Allows print options such as different baud rates, line spacing, page pause, partial print, multi-line headers/footers, page numbers, page number placement, and right justification. You can also change the values for these print options within the text by using embedded printer option codes.

INSTRUCTION MANUAL

Word Power 3 comes with a well-written and easy-to-comprehend instruction manual that makes writing with Word Power 3 a breeze.

Word Power 3 comes on disk for only **$69.95.**

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RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare *what character* "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service. An order form for these services is on the insert card bound in the magazine.

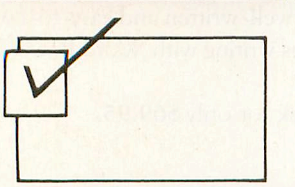
What's A CoCo?

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. (While many TDP-100s are still in service, the TDP Electronics division of Tandy no longer markets the CoCo look-alike.) It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and save it for later use, then type in the command `RUN` and press ENTER. Once the program has run, type `NEW` and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: `CMDS` and `SOURCE`. It also contains a file, `read.me.first`, which explains the division of the two directories. The `CMDS` directory contains executable programs and the `SOURCE` directory contains the ASCII source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the `SOURCE` directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

1) Type `load dir list copy` and press ENTER.
2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the sytem master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the `CMDS` directory, enter `dir cmds`. Follow a similar method to see what source files are in the `SOURCE` directory.
5) When you find a program you want to use, copy it to the `CMDS` directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmds/` *filename* `/d0/cmds/` *filename* `-s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/` *filename* `/d0/cmds/` *filename*

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

Using Machine Language

The easiest way to "put" a machine language program into memory is to use an editor/assembler, a program you can purchase from a number of sources. All you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of putting an ML listing into CoCo is called "hand assembly" — assembly by hand, which *sometimes* causes problems with `ORIGIN` or `EQUATE` statements. You ought to know something about assembly to try this.

Use the following program if you want to hand-assemble ML listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I, VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the `&H3F00` in Line 10 to `&H7F00` and change the value of `I` to `&H7F80`.

BOOKS & GRAPHICS

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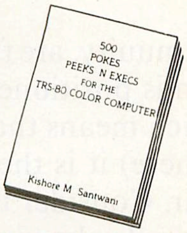
FOR THE TRS-80 COCO



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Some Random Thoughts . . .

You, as a member of the CoCo Community, are far luckier than I am. As I write this, the sun is positioned exactly over the Tropic of Capricorn, which means that (except for our friends in the Southern Hemisphere) it is the first day of winter and the shortest day of the year. Consider that when you actually read this it will be six weeks hence and the groundhog will be about to pop out of his burrow in Pennsylvania and, hopefully, forecast an end to winter.

It certainly is something to think about. Maybe that's why I am always behind the times.

Tandy's new flight simulator for the CoCo 3 is one of the all-time best. It is adapted from Microsoft's *Flight Simulator*, which has been in release in the MS-DOS market for some time.

As many of you know, I have a private pilot's license and fly a Cessna 172. The program is based on a Cessna 182, which is a little more powerful than my plane — but the feeling of flying is about the same.

For just about anyone who is learning to fly — or is just thinking about it — this flight simulator has all the goodies, including VOR receivers so you can practice instrument flying and approach techniques. It "behaves" like a real airplane in the air and is a great deal of fun to fly.

If you're looking for a shoot-'em-up in the air, forget it. But if you want, instead, to brush up on some techniques, this program is a safe, inexpensive and very realistic way to do all that and more.

It is probably as good a time as any to introduce you to Steven and Cheryl Walbutton of Broadmeadow, Australia.

As a number of you are aware, one of the first "overseas" locations in which the CoCo and THE RAINBOW thrived was the land "down under." A fine chap by the name of Greg Wilson called me one evening and asked to be able to reprint most of the "Yank" version of the magazine with some special "Aussie"

COCO 3 UTILITIES GALORE

(All utilities support 40/80 columns for CoCo 3)
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An excellent utility to keep track of your bowling scores. Allows you to save scores under individuals or teams. You can edit, change, delete and compare scores. A must for anyone who wants to keep track of his or her bowling performance. Disk **$19.95** (CoCo 2 version included).

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"For just about anyone who is learning to fly — or is just thinking about it — this flight simulator has all the goodies."

news as well under a royalty agreement. I told him to go ahead and a friendship was born.

Greg met an untimely end several years ago and others became involved with the Aussie edition. Then, just a few months ago, we reached an agreement with the Walbuttons to continue on in the same sort of tradition that Greg started. We've been quite pleased here and, from the way things are going "down there," it seems that much more than the kangaroos, koala bears and wombats are interested, too. We're glad that we are now able to provide a quality Australian version of THE RAINBOW again.

As a matter of fact, Steven and Cheryl have gone far beyond the call of duty. I'm fascinated with folk songs of other lands, and find the folk songs in Australia perfectly delightful. I even have a favorite singer, Slim Dusty, who has done some absolutely incredible songs that — at least to my mind — capture the feel and heartbeat of Australia.

I became "acquainted" with Dusty through a tape that included two terrific songs, "The Man From Snowy River" and "The Ballad of Henry Lawson." I asked the Walbuttons if there were any Slim Dusty tapes and have been happily playing them ever since. Seems I'm not the only one who likes him: He is supposed to be one of the top folk/country singers in Australia.

Dusty really captures the spirit of the land of which he sings through his lyrics. Here in the United States it is, of course, late December as I write this and, so, perhaps, it is fitting to quote a short passage from "The Man From Snowy River" in which Dusty sings of a place . . .

Where the air is clear as crystal
And the white stars fairly blaze
At midnight in the cold and frosty skies

I can just see Santa headed for my chimney through a night like that — an occurrence that is due the end of this week (provided that I've been good).

I hope 1988 will be good for all of you.

— Lonnie Falk

Corrections

"*RAMDisk* — Speedy File Handling" (Review, January 1988, Page 138): The *RAMDisk* review incorrectly stated that the product is available from Spectrum Projects. This product is available from Cer-Comp, 5566 Ricochet Avenue, Las Vegas, NV 89110, (702) 452-0632, for $19.95.

"The BASIC Versions" (Doctor ASCII, January 1988, Page 155): In his answer to Josh Abrams' question regarding the use of *EDTASM* on the CoCo 3, Richard Esposito presented a program, *Patch*, which was written by Roger A. Krupski. The last line of *Patch* was inadvertently left out of the listing. Just add the following line and *Patch* should work properly:

```
610 DATA "END","END"
```

"Making an Address List" (December 1987, Page 66): George F. Saunderson has written to indicate his phone number was incorrectly listed at the end of the article. The correct phone number is (713) 781-8984.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type `DATA` **at the CoCo SIG> prompt and** `INFO` **at the TOPIC> prompt.**

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Building February's Rainbow

The Ultimate Utility

If you are one of the thousands who've just received a new Color Computer for Christmas, congratulations, and welcome to THE RAINBOW. Our magazine is devoted to helping you learn all you can about how to get the most from your CoCo (short for Color Computer). If you missed our January beginners issue, don't worry, because every issue of RAINBOW has lots of material for beginners. In fact, in one aspect or another of the CoCo's many uses, all of us are beginners. And few of us will ever forget that thrill of discovery and feeling of control we experienced when we first powered up our CoCo and played with those short sample programs in the manual.

Today's Color Computer is a very powerful machine despite its very modest price. The fact is, thousands of us, when we bought our first Color Computer, paid four or five times as much for a machine that had only 4K of memory. Now the standard is a 128K machine that can easily be upgraded to as much as 512K. There's a lot of computer in that little white box.

In many ways, we'd love to be right there with you as you get to know your CoCo. Do you have your new machine hooked to the TV in the living room? That's how most of us started. But we soon found out that CoCoing there was not very convenient, so we took over the "spare" TV in the bedroom only to find out it really couldn't be spared after all. So, we purchased a TV or monitor just for the CoCo.

Are you using a non-Radio Shack cassette recorder? If so, you'll discover that while your old tape recorder will probably work, it won't work as well as the computer cassette recorder. Whatever the brand or model, do turn up the volume! We find that is one of the most common problems encountered by new users — yep, they just forgot to turn up the volume (set it on 3) so that the computer could "hear" the incoming data.

Have you bought a multi-plug "power strip" yet? Might as well get two to start with; you'll need the other one soon enough as you begin to develop your "computer corner," if not an entire room. Is your printer cable too short? You'll find a wide variety of cables, extensions and switch boxes of all types in the pages of RAINBOW. In fact, since the CoCo is now in its ninth calendar year, just about everything you discover you need will be readily available when you want it. Many of our advertisers have built their companies on anticipating the needs of CoCo users and then developing products to answer those needs. You'll learn a lot just by reading the ads!

One of the needs that is never fully satisfied is the need for utilities, the focus of this month's issue. A utility is a program or routine that is used as a tool in computing. It seldom has an end use in itself, but is used to help make other programs easier to use, faster executing and more efficient. As you "get into" computing, you'll discover why utilities are so popular.

For now, though, we want to welcome you to one of the most important "utilities" any Color Computer user can have: THE RAINBOW. Now that you've discovered THE RAINBOW, do consider a subscription to keep the information coming all year long. Together, we'll explore to the fullest the potential of our Color Computer.

— Jutta Kapfhammer

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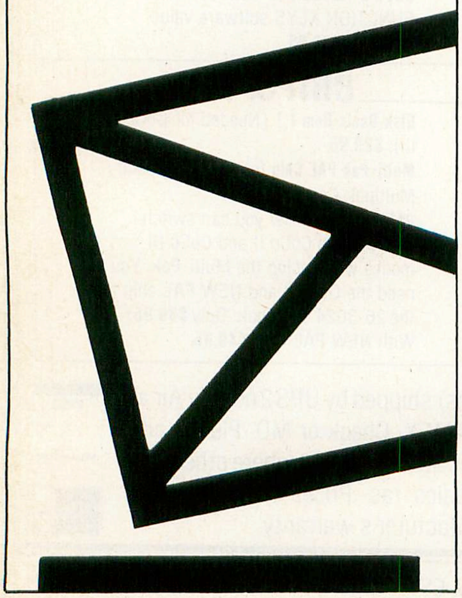

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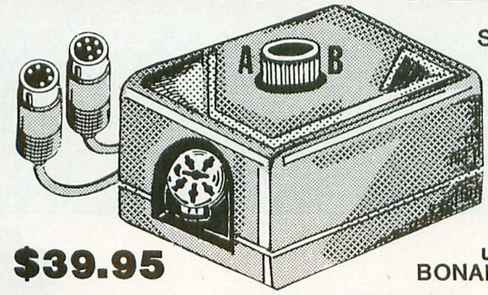

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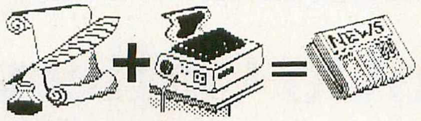

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WARP FIGHTER 3-D BY STEVE BJORK !

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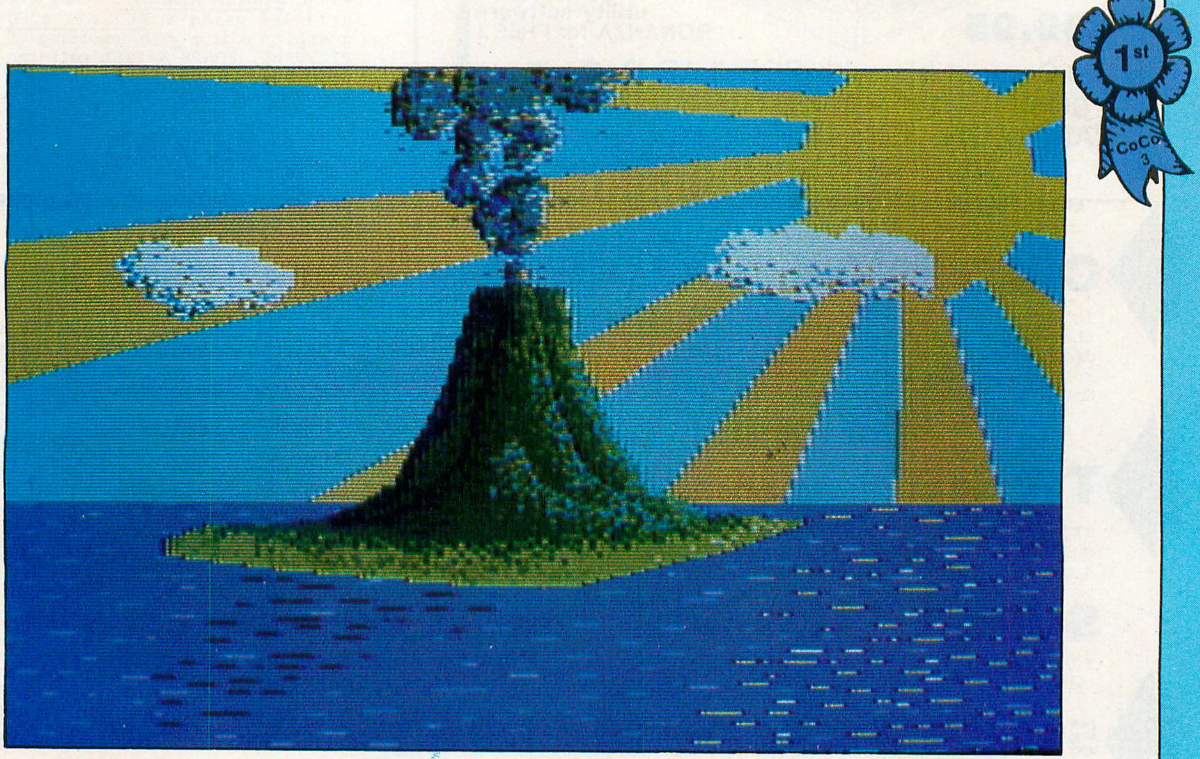
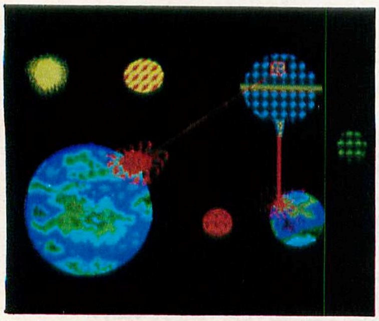
CoCo Gallery



Mysterious Island **Keith Schuler**

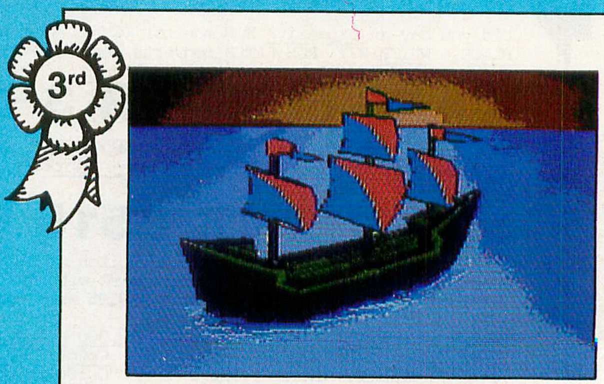
Keith used *CoCo Canvas*, a program he wrote, to design this inscrutable depiction. He lives in Merritt Island, Florida.

Honorable Mention



Destroy **James Farmer**

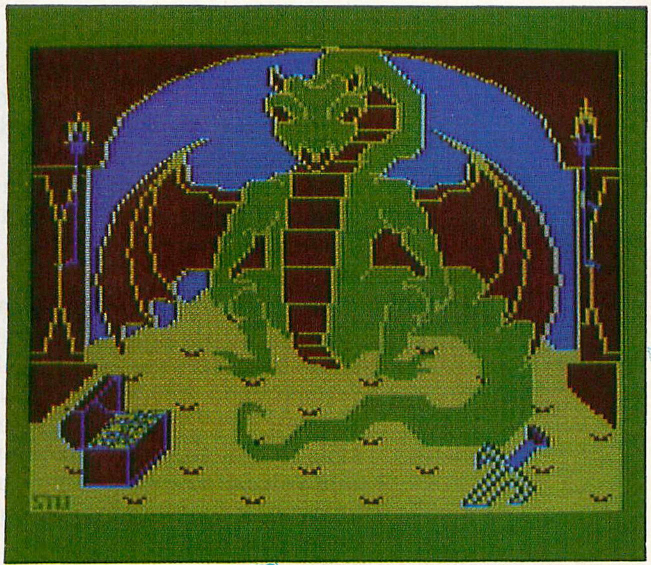
James, of N. Charleston, South Carolina, used *Color Max 3* to display this view of planetary combat.



Ship At Sea **Brad Bansner**

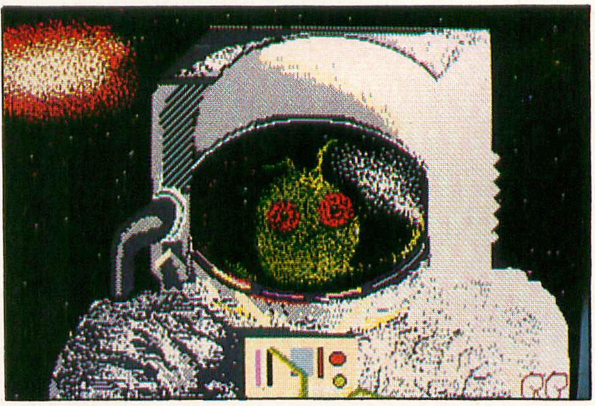
This image of a ship sailing into the sunset was originated with *Color Max 3*. Brad lives in Wyomissing, Pennsylvania.

We are taking "CoCo Gallery" to RAINBOWfest Chicago! See Page 35 for details.



Dragon **Stu Scott**

Stu, of Sandyhook, Connecticut, used BASIC to develop this animated scene. His hobbies include drawing, playing Adventure games and Shotokan karate.



Space Man **Richard Perreault**

This unexpected, horrendous-looking character was brought into being through *Color Max 3*. Richard lives in Boucherville, Quebec, and works for a telecommunications firm.

SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer, Curator

BASIC for Beginners

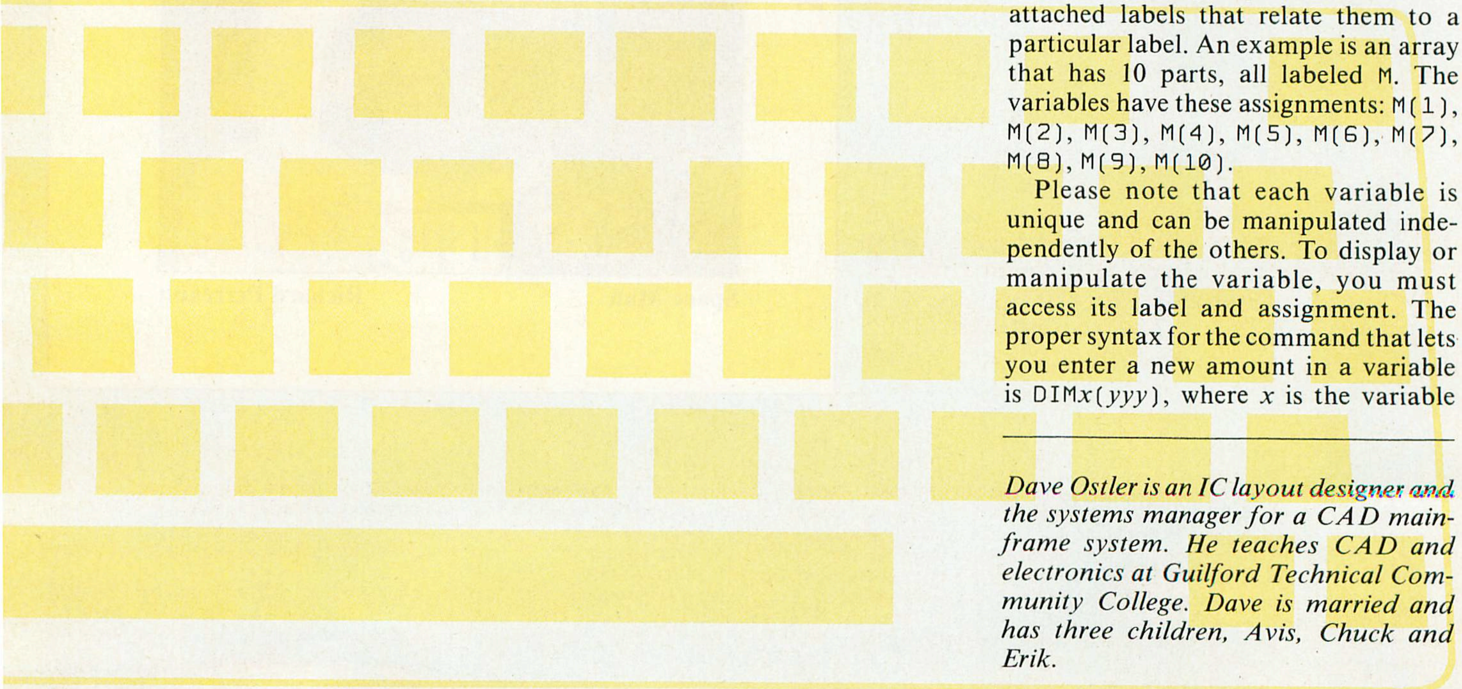
Lesson III

By David W. Ostler

So far in this series we have talked about commands that allow you to do some fairly impressive programming. But by no means can we cover all the commands utilized by the Color Computer BASIC language in only four installments.

We have already covered many common BASIC commands, giving you a solid base of programming skills to expand upon. You will eventually need to know how to make a program accessible to disk and tape input/output, so that you can save your results, but we'll cover disk and tape input/output in detail next month.

This month we will cover the commands necessary to determine whether a disk drive or cassette recorder is present. We will also discuss variable memory allocation and how to do logical comparisons of variables. In addition to a few new commands, we are presenting some variations on commands described in previous installments.



DIM

The `DIM` command sets up memory for use by predefined variable *arrays*.

An array is a group of variables with attached labels that relate them to a particular label. An example is an array that has 10 parts, all labeled `M`. The variables have these assignments: `M(1)`, `M(2)`, `M(3)`, `M(4)`, `M(5)`, `M(6)`, `M(7)`, `M(8)`, `M(9)`, `M(10)`.

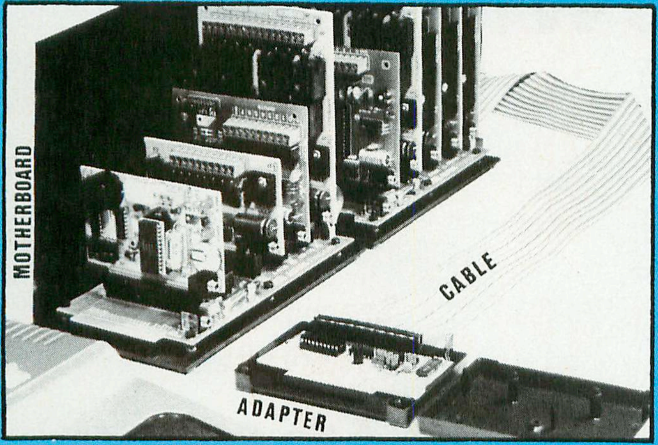
Please note that each variable is unique and can be manipulated independently of the others. To display or manipulate the variable, you must access its label and assignment. The proper syntax for the command that lets you enter a new amount in a variable is `DIM`*x*`(`*yyy*`)`, where *x* is the variable

---

Dave Ostler is an IC layout designer and the systems manager for a CAD mainframe system. He teaches CAD and electronics at Guilford Technical Community College. Dave is married and has three children, Avis, Chuck and Erik.

The Amazing A-BUS

NEW



An A-BUS system with two Motherboards
A-BUS adapter in foreground
The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

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An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card RE-140: $129

Includes eight industrial relays. (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card RE-156: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

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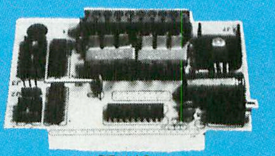
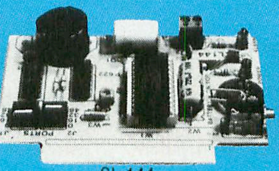
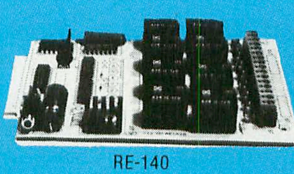


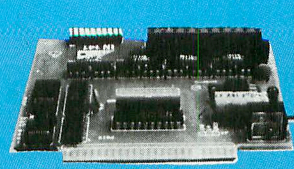
ST-143



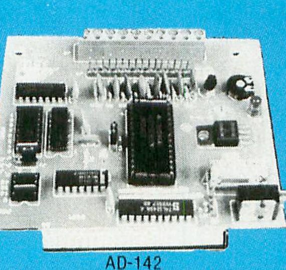
CL-144



RE-140



IN-141



AD-142

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TRS-80 Model 102, 200 Plugs into 40 pin "system bus"	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
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TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
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A-BUS Cable (3 ft, 50 cond.) CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.
Special cable for two A-BUS cards: CA-162: $34

A-BUS Motherboard MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

- The A-BUS is not a replacement for the Multi-pak

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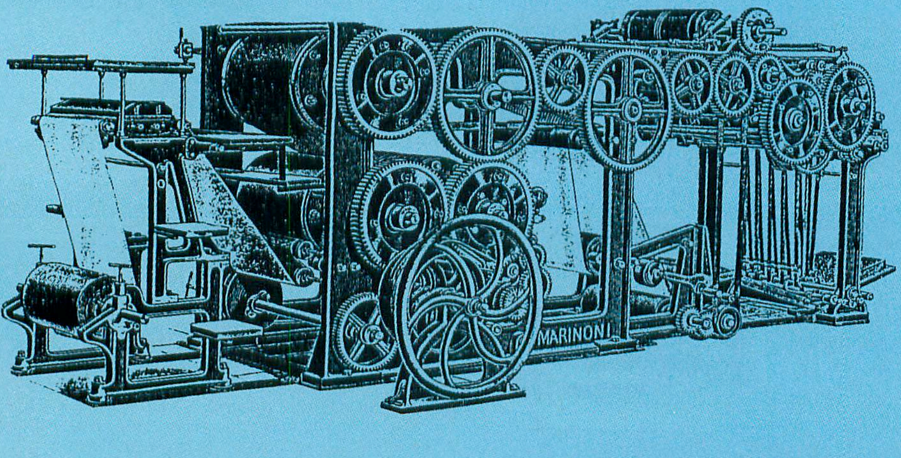

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- The new CoCo Max III **Hi-Res Interface** and the CoCo Max II **Hi-Res Pack** are *not* interchangable.
- The new interface plugs into the joystick connector.
- The CoCo Max III disk is not copy protected.
- CoCo Max III only works with the CoCo 3.
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- Colors are printed in five shades of gray.
- CoCo Max III can read CoCo Max II pictures.

Note: CoCo Max II (for the CoCo 2) is still available on disk ($79.95). CoCo Max I is still available on tape ($69.95). For details, refer to our double page ad in any *Rainbow* from January '86 to July '87

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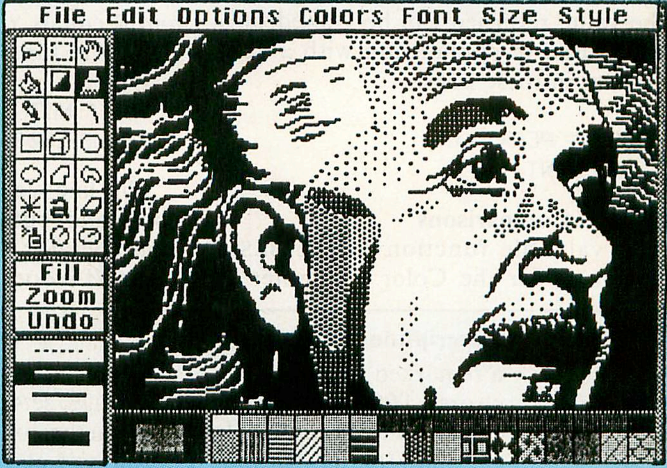
* Beware of inferior imitations that *DO NOT* include a Hi-Res Interface or charge extra for each utility.



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the array sets up (also called the label) and *yyy* is the number of variables in the group to be defined. The DIM command must always take place early in the program, *before* use of the CLEAR command.

PEEK

The PEEK command allows you to look at memory locations and determine various function values in the computer such as printer baud rate, disk or tape I/O, whether LIST and LLIST are disabled, etc.

The proper syntax for this command is PEEK (*xxx*), where *xxx* is the location to be examined or "peeked." Also, the value returned can be viewed only when used in conjunction with a variable, as in these lines:

```
10 A = PEEK(xxx)
20 PRINT A
```

Logical Comparisons

A valuable function of the BASIC language, for the Color Computer as well as other computers, is the ability to compare variables in a logical manner. *Logical comparison* determines whether variables are generated by program manipulation or entered by an external source by comparing the results of two variables. The logical comparison operators are AND, NOT, OR. Here is an example of logical comparison:

```
10 IF (A = X AND B = Y) THEN
GOSUB 1000
```

This line is basically an IF/THEN command, but with something extra — the logical comparison operator AND. The command line reads: If A equals X *and* B equals Y, then jump to the subroutine at Line 1000. Try this one:

```
10 IF NOT (A = X AND B = Y) THEN
GOSUB 1000
```

This line is also basically an IF/THEN command, but uses the logical comparison operator NOT. This command line reads: If A does *not* equal X *and* B does *not* equal Y, then jump to the subroutine at Line 1000. Try another:

```
10 IF (A = X OR B = Y) THEN GOSUB
1000
```

Again, the line is basically an IF/THEN command, but it includes the logical comparison operator OR. The command line reads: If A equals X *or* B equals Y, then jump to the subroutine at Line 1000.

These examples cover some of the ways to use the logical operators. The commands can be combined to obtain very elaborate logical comparisons of variables and are invaluable in programming.

LINEINPUT

The LINEINPUT command is exactly like the INPUT command covered in Lesson 1 (September 1987, Page 27), but with one exception: Where the INPUT command restricted the entry of variables to characters without punctuation, the LINEINPUT command al-

Line	Description
0	a remarked line.
10	clears 1,000 bytes for variable storage, sets T equal to 100, sets N equal to 0, and dimensions variables B$, C$, D$ and E$ to the size of 10 variables each.
20	a remarked line.
30	sets A equal to the value peeked at location 188.
40	a remarked line.
50	sets B equal to the value peeked at location 116.
60-80	test the values of A and B and steer the program to the proper location after these tests.
85	forces a jump to Line 2000.
95	a remarked line.
100	clears the screen, prints text and the value of N, prints a blank line, and allows the entry of variable B$ as related to the dimensioned variable label, N.
110	prints a blank line and allows the entry of variable C$ as related to the dimensioned variable label, N.
120	prints a blank line and allows the entry of variable D$ as related to the dimensioned variable label, N.
130	prints a blank line and allows the entry of variable E$ as related to the dimensioned variable label, N.
140-170	clear the screen and print the text with the variables entered in lines 100, 110, 120 and 130, respectively.
180	prints the text at the desired locations.
190	sets I$ to an INKEY$ function and tests the keyboard for the conditions found in this line. These conditions are used to correct any errors found in the variables entered in lines 140 to 170.
200	adds one count to the variable label N and checks the value of N — if N is equal to 10, it forces the program to Line 6000.
210	clears the screen and prints the text at the desired locations.
220	sets I$ to an INKEY$ function and tests the keyboard for the conditions found in this line.
300-330	the error correction lines for the INKEY$ function called in lines 180 to 190. After the corrections are made, the line forces a jump to Line 140.
900	sets up a FOR/NEXT value for B. Note: When displaying variables entered in arrays, you must use the variable label used in incrementing the array (at this time we are using N, as a label), minus 1 to count down the variable. Remember, the computer always counts — in this case, from 0 to 10.
910-940	display the text with its associated variables that are related to the variable array label value, B.
950	prints the text at the location.
960	sets I$ to an INKEY$ function and, if any key is pressed, will continue on with the program.
1000-2010	subroutines called by previous lines. The subroutine starting at Line 1000 identifies the type of computer system that the program has detected. The subroutine starting at Line 2000 is the menu for the data entry of the program.
5000	terminates the program.
6000	prints the message that the maximum file size for the array defined has been reached, and then sends the program to Line 900.

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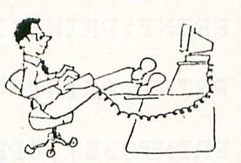

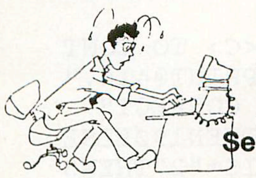

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lows punctuation in the variables entered. That's the only difference between the two commands.

Programming Exercise:

Using the methods presented in this article and the listing, write a program that will allow you to enter items you would want to list or find later in the program into arrays.

It is often difficult for new programmers (and, sometimes, old programmers, too!) to decipher the meaning of a line of BASIC code. I have embedded remark statements in the program shown in the listing to help. Refer to the chart on Page 24 for a line-by-line description.

In the final installment, Lesson IV, we will take this month's program, add data I/O, and enhance it further to allow easier data entry and correction.

Hints and Tips

Nothing puts a damper on a struggling beginner more quickly than trying to edit a program with BASIC's built-in editor. I find it cumbersome and difficult to use.

To make programming easier, you can use word processors such as *VIP* or *Telewriter* to write your programs. Save these programs in ASCII (`SAVE"` *filename*`",A`) with the proper extensions, etc. It may take longer to load and save, but the editing capabilities of these programs make this a minor inconvenience.

Those of you who want to know more about the commands available for your computer can purchase the TRS-80 *Pocket Handbook* from Radio Shack (Cat. No. 62-2024). It is one of the best investments you can make to assist you in learning programming. And if you're interested in learning more about the peeks and pokes available for the Color Computer, I recommend you read *500 POKES, PEEKS 'N EXECS for the TRS-80 CoCo*, marketed by Microcom Software.

Remember: Work smarter, not harder! □

The listing: `DATABASE`

```
 0 'BASIC NAME DATABASE PROGRAM.
THIS PROGRAM IS TO BE USED WITH
THE BASIC PROGRAMMING COURSE
WRITTEN BY DAVID W. OSTLER, COPY
RIGHT 1987
10 CLEAR1000:T=100:N=0:DIMB$(10)
:DIMC$(10):DIMD$(10):DIME$(10)
20 'CHECK FOR TAPE OR DISK SYSTE
M
30 A=PEEK(188)
40 'CHECK FOR 16K OR 64K SYSTEM
50 B=PEEK(116)
60 IF(A=14 AND B=127) THEN GOSUB
1000
70 IF(A=6 AND B=127) THEN GOSUB1
010
80 IF(A=6 AND B=63) THEN GOSUB10
20
85 GOTO2000
95 'FILES ENTERED HERE
100 CLS:PRINT"ADDRESS DATABASE #
 OF FILES";N:PRINT:LINEINPUT"ENT
ER NAME
          ";B$(N)
110 PRINT:LINEINPUT"ENTER ADDRES
S
";C$(N)
120 PRINT:LINEINPUT"ENTER CITY,
ST, &ZIP              ";D$(N)
130 PRINT:LINEINPUT"ENTER TELEPH
ONE NO.
";E$(N)
140 CLS:PRINT:PRINT"1. NAME- ";B
$(N)
150 PRINT:PRINT"2. STREET-";C$(N
)
160 PRINT:PRINT"3. STATE- ";D$(N
)
170 PRINT:PRINT"4. PHONE- ";E$(N
)
180 PRINT@357,"PRESS <C> TO CONT
INUE":PRINT@399,"OR":PRINT@416,"
  PRESS THE NUMBER TO CORRECT"
190 I$=INKEY$:IFI$=""THEN190ELSE
IFI$="1"THEN300ELSEIFI$="2"THEN3
10ELSEIFI$="3"THEN320ELSEIFI$="4
"THEN330ELSEIFI$="C"THEN200ELSE1
90
200 N=N+1:IFN=10GOTO6000
210 CLS:PRINT@456,"ANOTHER ENTRY
```

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM *routines*, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

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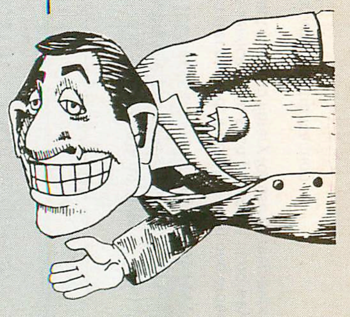

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```
(Y/N)"
220 I$=INKEY$:IFI$=""THEN220ELSE
IFI$="Y"THEN100ELSEIFI$="N"THEN9
00ELSE220
300 CLS:PRINT:PRINT:LINEINPUT"EN
TER NAME
      ";B$(N):GOTO140
310 CLS:PRINT:PRINT:LINEINPUT"EN
TER ADDRESS
          ";C$(N):GOTO140
320 CLS:PRINT:LINEINPUT"3. STATE
- ";D$(N):GOTO140
330 CLS:PRINT:PRINT:LINEINPUT"EN
TER TELEPHONE NO.
        ";E$(N):GOTO140
900 FORB=0TO N-1
910 CLS:PRINT:PRINT"1. NAME- ";B
$(B)
920 PRINT:PRINT"2. STREET-";C$(B
)
930 PRINT:PRINT"3. STATE- ";D$(B
)
940 PRINT:PRINT"4. PHONE- ";E$(B
)
950 PRINT@355,"PRESS ANY KEY TO
CONTINUE"
960 I$=INKEY$:IFI$=""THEN960
970 NEXTB
980 GOTO2000
1000 CLS:PRINT@230,"32/64K DISK
SYSTEM":FORX=1TO1000STEP1:NEXTX:
RETURN
1010 CLS:PRINT@228,"32/64K CASSE
TTE SYSTEM":FORX=1TO1000STEP1:NE
XTX:RETURN
1020 CLS:PRINT@229,"16K CASSETTE
 SYSTEM":FORX=1TO1000STEP1:NEXTX
:RETURN
2000 CLS:PRINT:PRINT" WELCOME TO
 THE BASIC DATABASE ":PRINT:PRIN
T"      WOULD YOU LIKE TO:":PRI
NT:PRINT:PRINT"       S)TART A NEW
 DATABASE":PRINT:PRINT"       E)
ND THIS PROGRAM":PRINT@458,"[SEL
ECT ONE]"
2010 I$=INKEY$:IFI$=""THEN2010EL
SEIFI$="S"THEN95ELSEIFI$="E"THEN
5000ELSE2010
5000 CLS3:PRINT@224,"        REBO
OTING TO BASIC":SOUND200,2:SOUND
100,3:FORX=1TO1000STEP1:NEXTX:CL
S:END
6000 CLS0:PRINT@224,"   MAXIMUM
FILE SIZE REACHED":SOUND200,2:SO
UND100,3:FORX=1TO1000STEP1:NEXTX
:GOTO900
```

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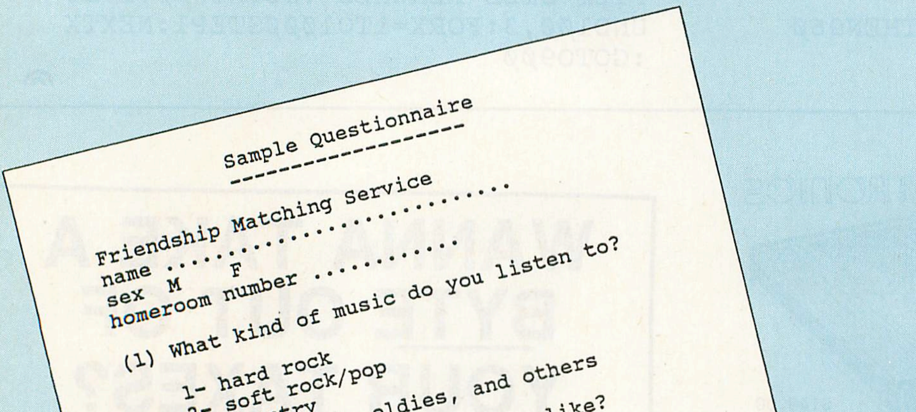
Let CoCo calculate friendship compatibility

Compu Match

By Robert Rogers



```
Sample Questionnaire
--------------------

Friendship Matching Service
name .........................
sex   M     F
homeroom number ...........

(1) What kind of music do you listen to?

      1- hard rock
      2- soft rock/pop
      3- country
      4- classical, oldies, and others

(2) What type of movies do you like?

      1-science fiction/fantasy
      2-comedy
      3-drama/romance
      4-action/horror

(3) Which accurately describes you?

      1-popular and outgoing
      2-wild and crazy
      3-quiet, cautious, and sensitive
      4-middle of the road

(4) What is your political philosophy?

      1-conservative
      2-liberal
      3-moderate
      4-anarchist

(5) What do you look for most in a friend?

      1-companionship
      2-generosity
      3-loyalty and understanding
      4-sense of humor and vitality
```

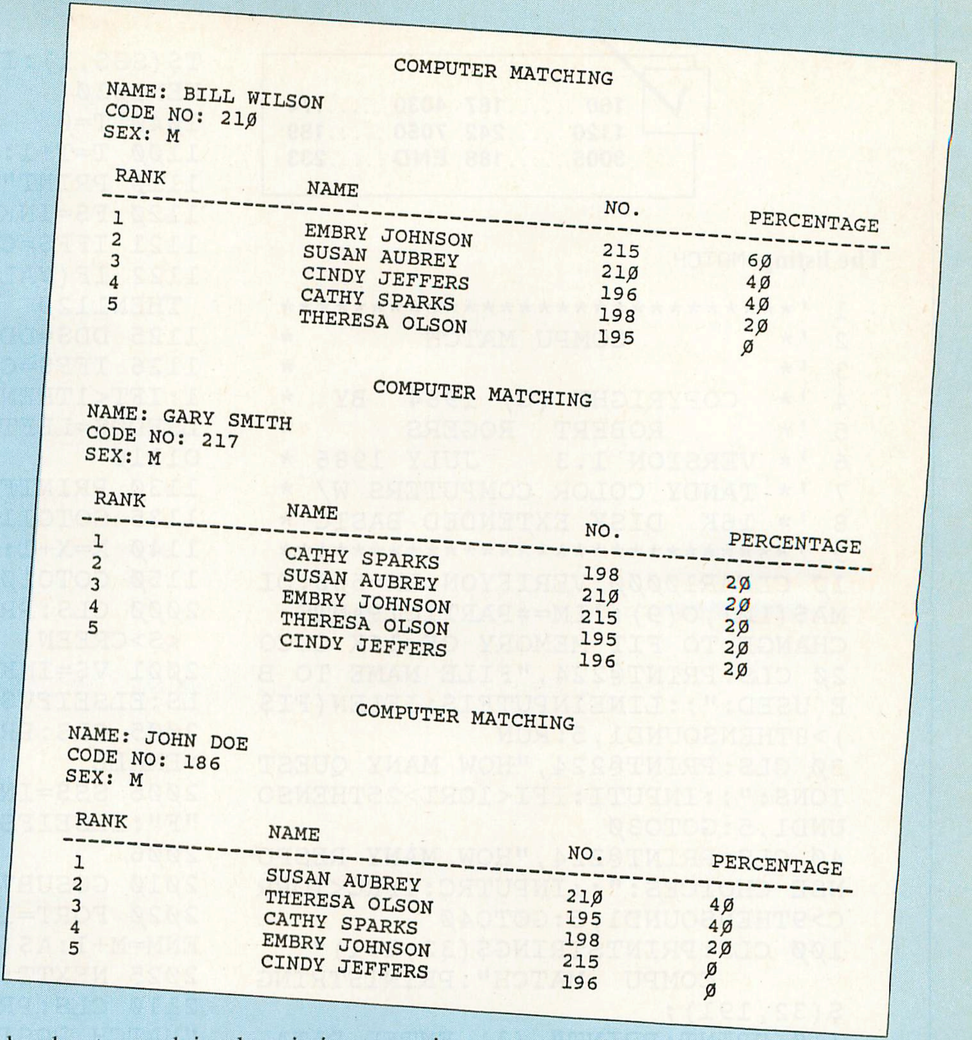
Compu Match is a program designed to match people who give similar responses to a questionnaire, and is aimed especially at clubs and organizations that want an interesting project or a way to raise money without selling trinkets or candy.

My high school computer club had good results using a similar program called *Computer Friendship Matching Service*, which I wrote for the IBM. We gave it the long name to convey that the program was just for fun, and to avoid the problems and negative connotations of a dating service.

Participants fill out questionnaires by answering multiple-choice questions about their personality, lifestyle and interests. Each person's data is entered into the computer. Then the program prints, for each participant, a list of five people of the opposite sex who had the

---

Robert Rogers is a self-taught programmer who is currently attending Florida Atlantic University, majoring in computer science. His interests include model railroading and playing the organ professionally.



```
                          COMPUTER MATCHING
NAME: BILL WILSON
CODE NO: 210
SEX: M

RANK            NAME
-----------------------------------------------------------------
                                              NO.        PERCENTAGE
1               EMBRY JOHNSON                 215           60
2               SUSAN AUBREY                  210           40
3               CINDY JEFFERS                 196           40
4               CATHY SPARKS                  198           20
5               THERESA OLSON                 195            0

                          COMPUTER MATCHING
NAME: GARY SMITH
CODE NO: 217
SEX: M

RANK            NAME
-----------------------------------------------------------------
                                              NO.        PERCENTAGE
1               CATHY SPARKS                  198           20
2               SUSAN AUBREY                  210           20
3               EMBRY JOHNSON                 215           20
4               THERESA OLSON                 195           20
5               CINDY JEFFERS                 196           20

                          COMPUTER MATCHING
NAME: JOHN DOE
CODE NO: 186
SEX: M

RANK            NAME
-----------------------------------------------------------------
                                              NO.        PERCENTAGE
1               SUSAN AUBREY                  210           40
2               THERESA OLSON                 195           40
3               CATHY SPARKS                  198           20
4               EMBRY JOHNSON                 215            0
5               CINDY JEFFERS                 196            0
```

highest percentages of similar responses.

I have included a five-question sample questionnaire, which you can use for a test run (five males and five females are needed in the file to avoid errors when matching). More questions are needed for the "real" run.

Upon running, you are asked what filename you are using. You must use the same filename when adding additional data. In order for the program to work on a 16K machine, the `CLEAR 10000` and `LM=500` statements in Line 10 require some modification — lower values. `LM` is the number of participants. If memory is limited, you could divide up the pool of participants by age or grade and use separate files. (Note: Participants can be matched only with others in the same file.)

A good promotion for your matching service is having the faculty participate (in a separate file) — this will yield hilarious results.

Next you are asked how many questions are on the form (maximum of 25) and the largest number of response choices for any one question (maximum of nine). A menu of six options appears.

Function 1 allows initial data to be entered and new data to be added. Enter the person's name, sex (M or F) and code number (we used homeroom numbers). Then, in sequence, type the responses. Use numbers, *not* letters. You won't need to press ENTER after each response. You can back up to correct a mistake by pressing the up arrow; the prompt includes the response number, so you will always know which one you are entering. No correcting is allowed after all the responses are entered.

Function 2 is the actual matching process. It prints to the screen or printer the top five match-ups and corresponding percentages for each participant. If you use the printer, the printouts can be delivered personally. To speed the process, males and females are done separately — you can select which to print first. So, to cover everyone, use Function 2 twice, selecting "female" first, and "male" next. You also have the option of starting with a specific "match position." Pressing ENTER begins printing the results for the first male or female in the file.

To have printing begin elsewhere in the file, enter the desired record number obtained with Function 3. The match position option enables you to print out a partial listing of participants and then continue where you left off later (this is harder to explain than it is to see in operation). The disk containing the data file *must* remain in the disk drive.

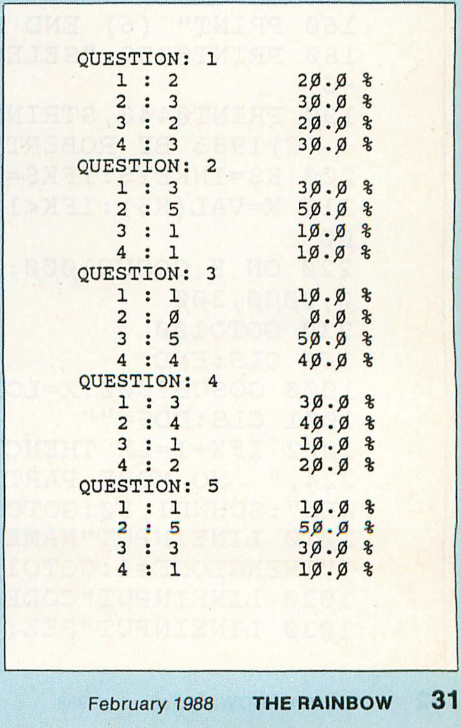
Function 3 lists to the screen or printer all the participants' data and file record numbers. These are not needed to use *Compu Match* unless you use the "match position" option previously described or need a file dump for debugging.

Function 4 allows you to print results for the person whose name you input. This could be used if a printout is lost or if you decide to have people line up at the computer to watch the results appear on the screen.

Function 5 is an extra feature that will compute for each question the percentage of participants that choose each response — it can be computed for males, females or both combined. These statistics can then be announced or printed in a newsletter or school newspaper for the general interest. This function could be used by itself (without using the matching process) as a quick questionnaire tabulator.

Function 6 should be used to end operation and ensure proper file closing.

(Questions or comments about this program may be directed to the author at 10228 Anthony Groves Road, West Palm Beach, FL 33414. Please enclose an SASE when writing for a reply.) ☐



```
QUESTION: 1
   1 : 2              20.0 %
   2 : 3              30.0 %
   3 : 2              20.0 %
   4 : 3              30.0 %
QUESTION: 2
   1 : 3              30.0 %
   2 : 5              50.0 %
   3 : 1              10.0 %
   4 : 1              10.0 %
QUESTION: 3
   1 : 1              10.0 %
   2 : 0               0.0 %
   3 : 5              50.0 %
   4 : 4              40.0 %
QUESTION: 4
   1 : 3              30.0 %
   2 : 4              40.0 %
   3 : 1              10.0 %
   4 : 2              20.0 %
QUESTION: 5
   1 : 1              10.0 %
   2 : 5              50.0 %
   3 : 3              30.0 %
   4 : 1              10.0 %
```

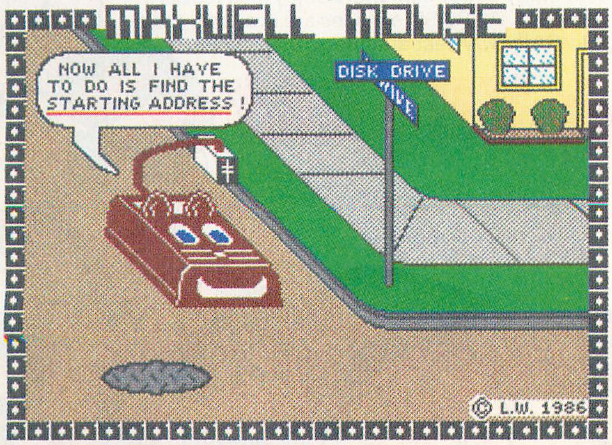
160	167	4030	74
1120	242	7050	189
3005	188	END	233

The listing: MATCH

```
1 '*****************************
2 '*         COMPU MATCH        *
3 '*                            *
4 '*  COPYRIGHT (C) 1984  BY    *
5 '*       ROBERT  ROGERS       *
6 '* VERSION 1.3     JULY 1986 *
7 '* TANDY COLOR COMPUTERS W/ *
8 '* 16K  DISK EXTENDED BASIC *
9 '*****************************
10 CLEAR10000:VERIFYON:LM=500:DI
MA$(LM),O(9):'LM=#PARTICIPANTS,
CHANGE TO FIT MEMORY OF 16K COCO
20 CLS:PRINT@224,"FILE NAME TO B
E USED:";:LINEINPUTFI$:IFLEN(FI$
)>8THENSOUND1,5:RUN
30 CLS:PRINT@224,"HOW MANY QUEST
IONS:";:INPUTI:IFI<1ORI>25THENSO
UND1,5:GOTO30
40 CLS:PRINT@224,"HOW MANY RESPO
NSE CHOICES:";:INPUTRC:IFRC<1ORR
C>9THENSOUND1,5:GOTO40
100 CLS:PRINTSTRING$(32,191)"
      COMPU  MATCH":PRINTSTRING
$(32,191);
110 PRINT:PRINT" (1) ENTER DATA
120 PRINT" (2) RUN MATCHING PROC
ESS
130 PRINT" (3) LIST DATA
140 PRINT" (4) MATCH ONE PERSON
150 PRINT" (5) COMPILE STATISTIC
S
160 PRINT" (6) END SESSION
180 PRINT@358,"SELECT OPTION   (1
-6)
190 PRINT@448,STRING$(32,191)"
 (C)1985 BY ROBERT ROGERS";
200 K$=INKEY$:IFK$=""THEN200
210 K=VAL(K$):IFK<1 OR K>6 THEN2
00
220 ON K GOSUB1000,2000,4000,600
0,9000,300
230 GOTO100
300 CLS:END
1000 GOSUB7000:X=LOF(1)
1001 CLS:DD$=""
1002 IFX+1=LM THENCLOSE#1:PRINT@
224,"  NO MORE PARTICIPANTS ALLO
WED":SOUND1,30:GOTO100
1010 LINEINPUT"NAME:";NN$:IFNN$=
""THENCLOSE#1:GOTO100
1020 LINEINPUT"CODE NUMBER:";HH$
1030 LINEINPUT"SEX:";SS$:SS$=LEF
T$(SS$,1):IFSS$<>"M"ANDSS$<>"F"T
HEN1030
1040 T=0
1100 T=T+1:IFT=I+1THEN1140
1110 PRINT"RESPONSE"T":";
1120 F$=INKEY$:IFF$=""THEN1120
1121 IFF$=CHR$(94)THEN1125
1122 IF(VAL(F$))<1OR(VAL(F$))>RC
 THEN1120
1125 DD$=DD$+F$
1126 IFF$=CHR$(94)THENPRINT:T=T-
1:IFT<1THENT=1:DD$="":GOTO1110:E
LSEDD$=LEFT$(DD$,LEN(DD$)-2):GOT
O1110
1130 PRINTF$
1135 GOTO1100
1140 X=X+1:GOSUB8000
1150 GOTO1001
2000 CLS:PRINT@229,"<P>RINTER OR
 <S>CREEN
2001 V$=INKEY$:IFV$="S"THENV=0:C
LS:ELSEIFV$="P"THENV=-2:ELSE2001
2005 CLS:PRINT@231,"<M>ALE OR <F
>EMALE
2006 SS$=INKEY$:IFSS$="M"THENO$=
"F":ELSEIFSS$="F"THENO$="M":ELSE
2006
2010 GOSUB7000:L=LOF(1):M=0
2020 FORT=1TOL:GET#1,T:IFS$=O$TH
ENM=M+1:A$(M)=D$+STR$(T)
2025 NEXTT:IFF=1THENX=0:GOTO3000
2110 CLS:PRINT@224,"";:LINEINPUT
"MATCH POSITION:";C$:C=VAL(C$):I
FC<1THENC=1:ELSEIFC>L THENC=L
2120 X=C-1
3000 X=X+1:PRINT@0,X;:IFX=L+1THE
NCLOSE#1:GOTO100
3001 GET#1,X:IFS$<>SS$THEN3000:E
LSEU$=N$:I$=H$
3005 IFF=1THENIFINSTR(1,N$,M$)<1
THEN3000
3010 FORQ=1TO5:P(Q)=0:PP(Q)=0:NE
XTQ
3015 T=0
3020 T=T+1:R=0:IFT=M+1THEN3120
3030 FORQ=1TOI
3040 IFMID$(D$,Q,1)=MID$(A$(T),Q
,1)THENR=R+1
3050 NEXTQ
3060 P=(R/I)*100:Y=0
3070 Y=Y+1:IFY=6THEN3110
3080 IFP<P(Y)THEN3070
3090 FORZ=5TOY STEP-1:P(Z+1)=P(Z
):PP(Z+1)=PP(Z):NEXTZ:P(Y)=P:PP(
Y)=VAL(RIGHT$(A$(T),(LEN(A$(T))-
25)))
3110 GOTO3020
3120 GOSUB5000
3130 GOTO3000
4000 CLS:PRINT@229,"<P>RINTER OR
```

```
 <S>CREEN
4005 V$=INKEY$:IFV$="S"THENV=0:C
LS:ELSEIFV$="P"THENV=-2:ELSE4005
4010 GOSUB7000
4030 FORT=1TOLOF(1):GET#1,T:PRIN
T#V,N$:PRINT#V,T" "D$;" "S$;" ";
H$
4035 IFV=0THENIFPEEK(338)<>191TH
ENPOKE338,255:GOTO4035
4040 NEXTT:CLOSE#1
4999 EXEC44539:RETURN
5000 CLS:IFV=-2THENPRINT#V,TAB(3
1)"COMPUTER MATCHING
5010 PRINT#V
5020 PRINT#V,"NAME: "U$
5030 PRINT#V,"CODE NO: "I$
5040 PRINT#V,"SEX: "SS$
5041 IFV=0THENGOTO5200
5050 PRINT#V:PRINT#V," RANK","NA
ME",,"NO."," PERCENTAGE":PRINT#V
,STRING$(80,"-")
5060 FORZ=1TO5:GET#1,PP(Z)
5080 PRINT#V,Z,N$,H$,P(Z)
5090 NEXTZ:PRINT#V:PRINT#V
5100 RETURN
5200 FORZ=1TO5:GET#1,PP(Z)
5210 PRINTZ;LEFT$(N$,25):PRINT"N
O. :"H$" PERCENTAGE MATCH:"P(Z)
5220 NEXTZ
5230 IFPEEK(338)<>191THENPOKE338
,255:GOTO5230ELSEPOKE338,255:CLS
:RETURN
6000 CLS:PRINT@224,"NAME OF PERS
ON TO MATCH:":LINEINPUTM$
6010 F=1:GOTO2000
7000 OPEN"D",#1,FI$,60
7010 FIELD#1,30ASN$,4ASH$,25ASD$
,1ASS$
7040 L=LOF(1)
7050 RETURN
8000 LSETN$=NN$:LSETH$=HH$:LSETD
$=DD$:LSETS$=SS$
8010 PUT#1,X
8015 RETURN
9000 CLS:PRINT@229,"<P>RINTER OR
 <S>CREEN
9010 V$=INKEY$:IFV$="S"THENV=0:C
LS:ELSEIFV$="P"THENV=-2:ELSE9010
9020 CLS:PRINT@200,"STATISTICS F
OR :":PRINT@229,"<M>ALE <F>EMALE
 <B>OTH"
9030 B$=INKEY$:IFB$<>"M"ANDB$<>"
F"ANDB$<>"B"THEN9030
9040 CLS:N=0:GOSUB7000
9050 FORQ=1TOI:FORK=1TORC:O(K)=0
:NEXTK:FORT=1TOL
9060 GET#1,T
9070 IFB$="F"THENIFS$="F"THENIFQ
=1THENN=N+1:GOTO9090:ELSEGOTO909
0ELSE9100
9080 IFB$="M"THENIFS$="M"THENIFQ
=1THENN=N+1:GOTO9090:ELSE9090ELS
E9100
9085 IFQ=1THENN=N+1
9090 K=VAL(MID$(D$,Q,1)):O(K)=O(
K)+1
9100 NEXTT:PRINT#V,"QUESTION:"Q:
FORK=1TORC:PRINT#V,"  "K":"O(K),
:PRINT#V,USING"###.#";(O(K)/N)*1
00;:PRINT#V," %":NEXTK
9110 IFV=0THENIFPEEK(338)<>191TH
ENPOKE338,255:GOTO9110
9120 NEXTQ:CLOSE#1:GOTO100
```

Mouse Tales By Logan Ward


MAXWELL MOUSE
NOW ALL I HAVE TO DO IS FIND THE STARTING ADDRESS!
DISK DRIVE
© L.W. 1986

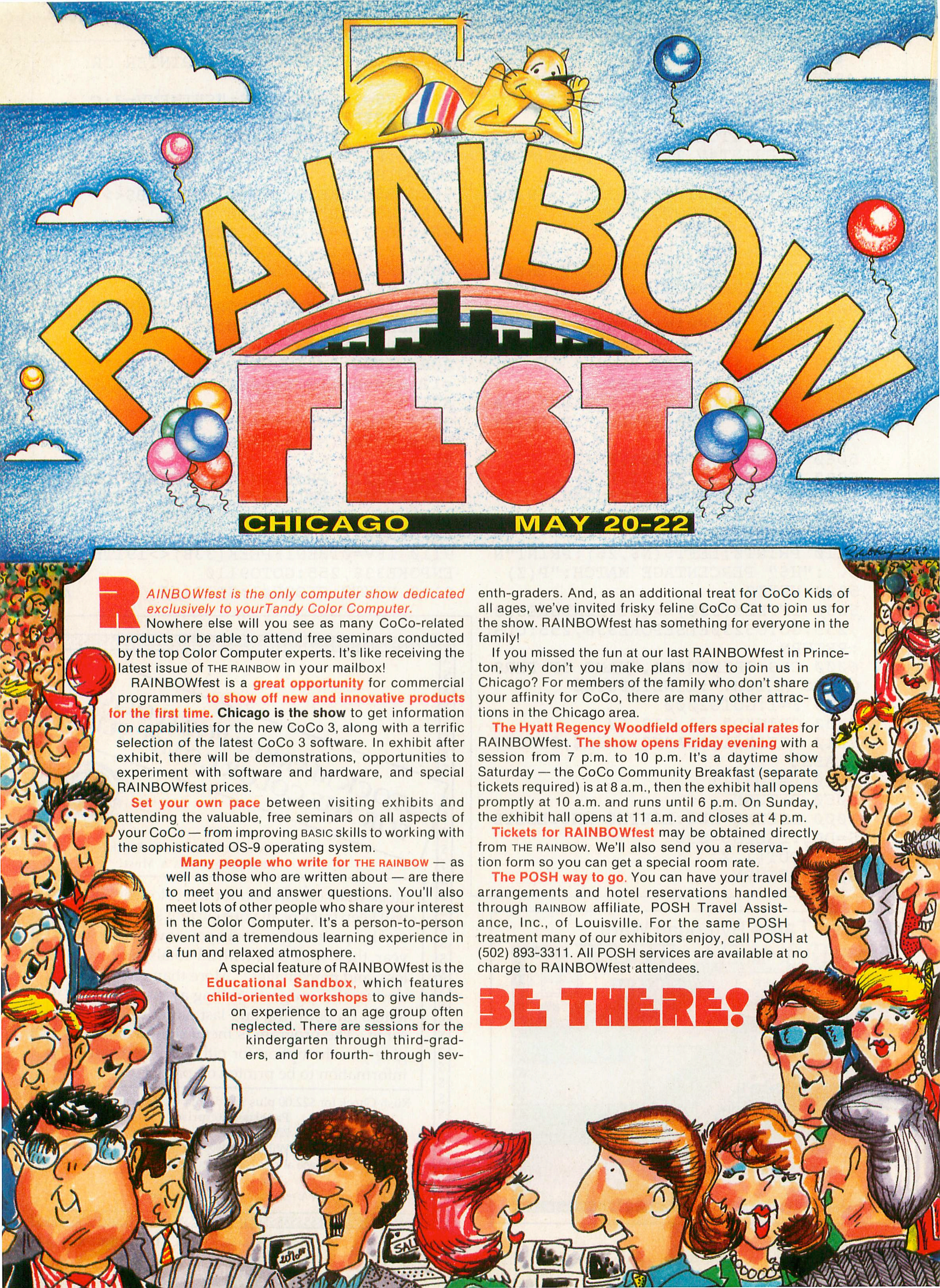
STOCK MARKET PORTFOLIO
FOR THE COLOR COMPUTER

RAINBOW CERTIFICATION SEAL

**If You Are Serious About Stocks. . .
This Program Is A Must!**

Stock Market portfolio for the color computer will keep track of all your current stock listings and keep a listing of stocks you have sold by the year, they were sold with all totals, profit and loss, and percentages. More than one person can use this program as long as the first three letters on both first and last name are not the same. The program is menu driven and will give you the option for either screen print or information to be printed on printer.

Rush Check for $22.00 plus $3.00 shipping & handling to:
Paparis Enterprises
700 York St.
Williamsburg, VA 23185
Please allow 2-3 weeks for delivery
Sorry no C.O.D.S
VA residents add 4.5% sales tax.



RAINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer.

Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time. Chicago is the show** to get information on capabilities for the new CoCo 3, along with a terrific selection of the latest CoCo 3 software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

A special feature of RAINBOWfest is the **Educational Sandbox**, which features **child-oriented workshops** to give hands-on experience to an age group often neglected. There are sessions for the kindergarten through third-graders, and for fourth- through seventh-graders. And, as an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

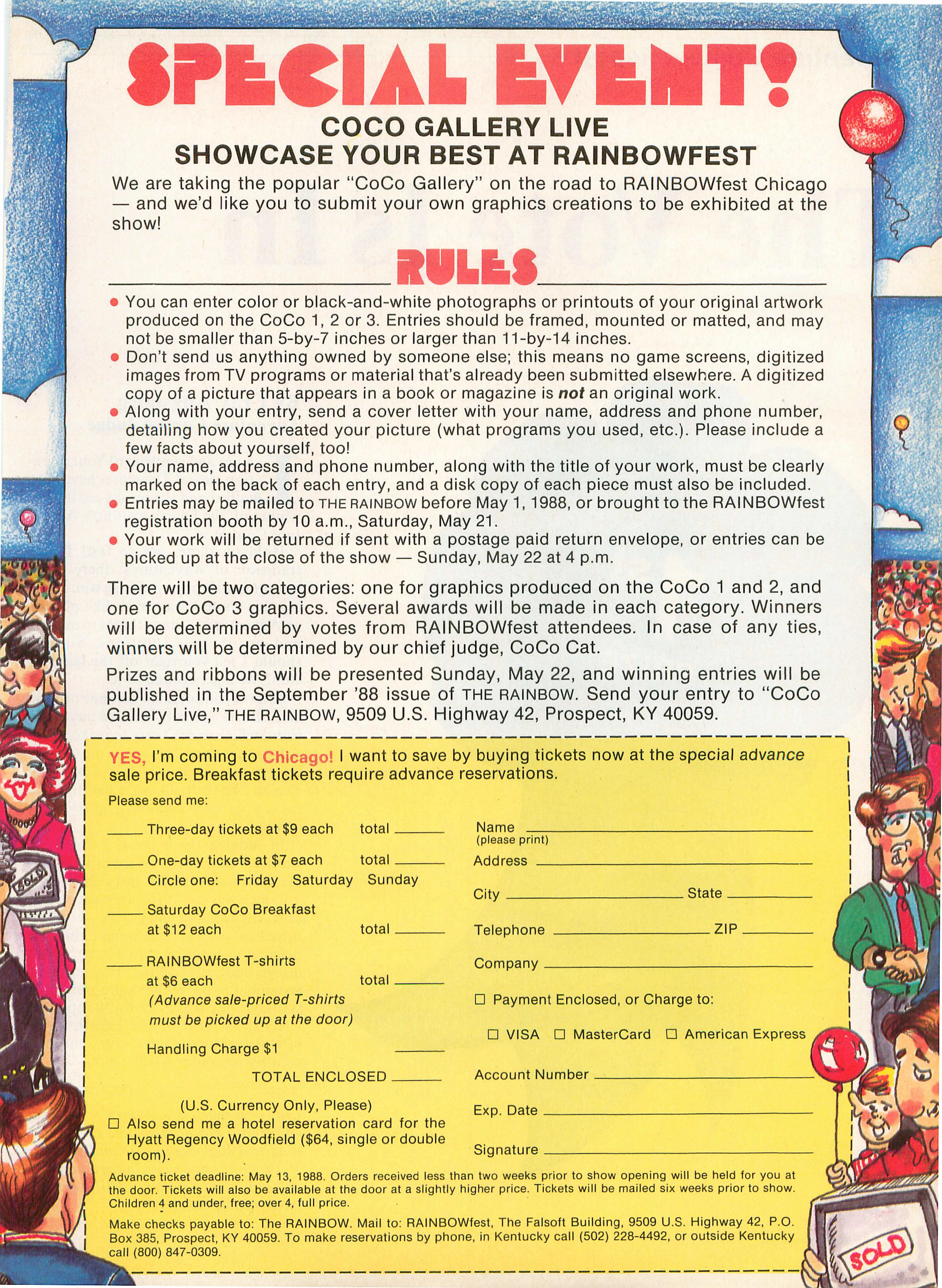
If you missed the fun at our last RAINBOWfest in Princeton, why don't you make plans now to join us in Chicago? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Chicago area.

The Hyatt Regency Woodfield offers special rates for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

BE THERE!



SPECIAL EVENT!

COCO GALLERY LIVE

SHOWCASE YOUR BEST AT RAINBOWFEST

We are taking the popular "CoCo Gallery" on the road to RAINBOWfest Chicago — and we'd like you to submit your own graphics creations to be exhibited at the show!

RULES

- You can enter color or black-and-white photographs or printouts of your original artwork produced on the CoCo 1, 2 or 3. Entries should be framed, mounted or matted, and may not be smaller than 5-by-7 inches or larger than 11-by-14 inches.
- Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is ***not*** an original work.
- Along with your entry, send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.). Please include a few facts about yourself, too!
- Your name, address and phone number, along with the title of your work, must be clearly marked on the back of each entry, and a disk copy of each piece must also be included.
- Entries may be mailed to THE RAINBOW before May 1, 1988, or brought to the RAINBOWfest registration booth by 10 a.m., Saturday, May 21.
- Your work will be returned if sent with a postage paid return envelope, or entries can be picked up at the close of the show — Sunday, May 22 at 4 p.m.

There will be two categories: one for graphics produced on the CoCo 1 and 2, and one for CoCo 3 graphics. Several awards will be made in each category. Winners will be determined by votes from RAINBOWfest attendees. In case of any ties, winners will be determined by our chief judge, CoCo Cat.

Prizes and ribbons will be presented Sunday, May 22, and winning entries will be published in the September '88 issue of THE RAINBOW. Send your entry to "CoCo Gallery Live," THE RAINBOW, 9509 U.S. Highway 42, Prospect, KY 40059.

YES, I'm coming to **Chicago!** I want to save by buying tickets now at the special *advance* sale price. Breakfast tickets require advance reservations.

Please send me:

____ Three-day tickets at $9 each total ____

____ One-day tickets at $7 each total ____
Circle one: Friday Saturday Sunday

____ Saturday CoCo Breakfast at $12 each total ____

____ RAINBOWfest T-shirts at $6 each total ____
(Advance sale-priced T-shirts must be picked up at the door)

Handling Charge $1 ____

TOTAL ENCLOSED ____

(U.S. Currency Only, Please)

☐ Also send me a hotel reservation card for the Hyatt Regency Woodfield ($64, single or double room).

Name ____
(please print)

Address ____

City ____ State ____

Telephone ____ ZIP ____

Company ____

☐ Payment Enclosed, or Charge to:

☐ VISA ☐ MasterCard ☐ American Express

Account Number ____

Exp. Date ____

Signature ____

Advance ticket deadline: May 13, 1988. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

The Vote Is In

By Cray Augsburg
Adventure Contest Judge

Ladies and gentlemen! Your attention please! The scores have been tallied and the results are in. The winner of The Fourth RAINBOW Adventure Contest is. . .

Hold on there, not so fast! In the tradition of Adventures, there is no instant gratification, no easy win. Judging this contest was much like playing an Adventure — many things to explore and no obvious solutions. So why should I tell you right off the bat who won? We'll get around to it.

After a considerable amount of time and effort, I finally reached my decisions, which weren't easy to make. Each Adventure had its own unique and interesting aspects, and it was really easy to like them all. So, I had to force myself to consider each entry as a complete package.

In judging the contest, I knew the winner would be the person who sent in the most well-rounded entry. The use of graphics was not a requirement. However, the winning entry would be comprised of complete documentation, an original concept or theme, and logical design and organization. It would be a testament to the author's programming skills, yet be easy for the user to operate. I feel the winner of The Fourth RAINBOW Adventure Contest came through with flying colors on all counts.

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

What's an Adventure?

It's simply a game, but not necessarily a simple one. Playing an Adventure requires a certain level of skill and cunning. Since the concept of the game is not grounded in reality, you must be ready for the unexpected to pop up at any time. It all depends on the author's understanding of how the average human mind works. Just when you think you've got it solved, you find something else is required of you — something that makes the least (or, depending on how you look at it, the most) sense. Adventures can be quite frustrating.

The goal in writing an Adventure is to capture the Adventurer and take him right to the frustration threshold — where he's just about ready to put his foot through the keyboard — and then give him a faint glimmer of hope. Let him gain a little, then start the process again. This is what keeps Adventurers coming back for more, and is also a sign of a well-written Adventure.

Obviously, programming an Adventure takes quite a bit of effort. The author must be knowledgeable and clever, and must understand programming concepts and skills; otherwise, you might find the solution just by looking at the program listing. The good Adventure writer will invent a story line that stretches the imagination.

I am proud to say the level of quality in the entries we received was unbelievably high. However, this only made the decisions that much harder to make. So many people deserved to win, but only one could take home the grand prize. In the spirit of competition, though, everyone was a winner. If you sent in an entry, give yourself a pat on the back for a job well done — you deserve it.

The Entries

What kind of Adventures did we see? We saw plenty of graphics! As a matter of fact, most of the Adventures submitted utilized graphics in one way or another. Of the many CoCo 3 entries, nearly 90 percent were graphics Adventures — and most were darn good, too! Creative use of graphics never fails to please people. The CoCo 1 and 2 graphics Adventures were something to behold, as well. It never fails to amaze me what can be done with a simple `PMODE4` screen and a few artifacted colors.

Now, lest we concern those who did not use graphics, remember that the "original" computer Adventure game had text only. The use of graphics has never been necessary to an Adventure's success. It is true that graphics enhance a program, but they are not necessary. In many cases, it is better to let the Adventurer's imagination create the scene. In fact, graphics can sometimes distract the player. Often it is best to let the readers' impressions of the events help them create mental pictures.

As far as equipment requirements, the entries varied. Some Adventures ran in 4K without Extended Color BASIC, and others squeezed every available byte out of a 128K CoCo 3. We did not receive any entries written under OS-9, which is somewhat surprising considering BASIC09's power and flexibility. Oh well, that's a story for another day.

Some entries used music and sound effects. Being musically inclined, I had hoped to hear some fancy 12-voice music. It wasn't to be. (Maybe we can have a music programming contest someday). For the most part, though, the music and sound effects used were very appropriate.

The level of programming found in the entries was really amazing. It is fascinating to see a skilled programmer's work. I can imagine the programmer hovering over his keyboard like a concert pianist. And mastery of the CoCo ivories has certainly been evidenced by the compositions I "heard."

While most of the commands used in the entries we received would be familiar to even the most inexperienced Adventurer, some programmers broke new ground. Along with the old faithfuls (`GO` and `INVENTORY`) were `SAY`, `SPEAK`, `GOBBLE` and `COMPUTE`. In addition, some programmers abandoned the old "type-it-in" approach for the new "point-and-click" powers of the joystick and mouse. Our grand prize winning entry utilizes icons in a very easy-to-understand and realistic way and requires keyboard entry only when absolutely necessary.

From the standard tricks of using hundreds of `GOSUB`s to poking the key routines in machine language, no holds were barred as the entrants scrambled to keep their secrets intact. And what is their motivation? While they would never admit it, they just want to make you work. I think that's fair — they worked hard to bring you the best they had to offer, and they want to make sure you enjoy it!

In relation to this, I must give advance notice: RAINBOW is not in any way, shape or form going to give you the solutions! That would just be the easy way out. Hints may be offered in "Scoreboard Pointers," but the brunt of the work remains with you, the Adventurer. That, after all, is the whole point. Try to outguess the author in each case. He does have the upper hand, but he hasn't made the game impossible. I guess what I'm really saying is: *Enjoy*! And now for the winners.

CoCo 3 Graphics Best of Show and Grand Prize is presented for the second consecutive time to Dr. Bruce Bell, an optometrist from Rockmart, Georgia. Dr. Bell's work has graced the pages of THE RAINBOW several times in the past. And each time he has done himself a little better. Dr. Bell did a professional job with this year's winning entry, *The Controllers* (see Page 42). His organizational and programming skills do not go unnoticed.

The Controllers is set "slightly" into the future. Your character is a scavenger in a time when technology has been banished from the Earth — the planet was overtaken by an alien race that uses thought control to reduce humans to primitivism. Your goal is to free the human race from this control.

Dr. Bell's entry is written for the CoCo 3 and will work with color composite or RGB monitors, as well as tape or disk. A mixture of graphics, text and sound gave this entry an edge in the competition. More importantly, the use of a joystick/ mouse user interface gave it the final push into the winning position. While the use of such an interface is not unique in itself, the appropriate manner in which it is implemented here must be seen to be appreciated.

The Controllers is comprised of two BASIC programs, one of which "sets up" the system. The other program is the main body of the Adventure, which features games within itself. To achieve a fine balance between program features and efficiency, Dr. Bell utilized many techniques, including some dabbling into the "deep, dark world" of machine language. We commend Dr. Bell for his excellent work and hope to see more programs from him in the future.

Non-Graphics Best of Show goes to Jeff Hillison, of Blacksburg, Virginia, for his entry, *Intrigue*. This Adventure casts you as an allied spy stuck in Berlin in the midst of WWII. Your mission is to find the plans for the impending German invasion of Britain.

Clues in the form of a letter and burlesque show guide accompanied this entry; these clues are required to solve the Adventure, and add a certain sense of realism to the game. Jeff also uses several interesting commands. Never before have I seen `SHAKE` and `FLUSH` used in an Adventure, but they are here.

This Adventure is not an easy one to solve. (OK! Yes, I had to cheat and look at the solution.) With 60 rooms, nearly 90 different objects and over 30 commands at your disposal, the play can get quite complex. I thoroughly enjoyed this Adventure.

Jeff is a freshman at Virginia Tech, where he is majoring in accounting. He has been working with the CoCo since 1983, and wrote his first Adventure in 1985.

CoCo 3 Graphics Runner-Up and Second Place go to Charles Farris. His entry, *Term Paper*, had a very interesting story line: You are a student at CoCo State University and someone has stolen your term paper. You must search the campus and retrieve all 30 pages of the paper before it is due.

I really empathized with the character in this Adventure. I don't know how many times "the dog ate my term paper, honest!" The play was enjoyable and interesting, incorporating levels of ability within the character: Fighting Factor, Health Points, Personality Points and Money Amount.

The University is shown in the form of an onscreen map, but the locations of the pages are not given. As you move around the campus, you will be struck by the realism of the game.

Charles is a self-taught BASIC programmer who has enjoyed programming his CoCo for the last three years, and is currently with the U.S. Air Force, stationed overseas in Europe.

Third Place goes to Dr. Eugene A. Carver, from Galena, Ohio, for *SDI — Countdown to Doom*: A criminal mastermind has overtaken NORAD at Cheyenne Mountain, and you must stop his native country from demolishing civilization as we know it. You think you are alone in your mission, but are you? The solution requires a great deal of thought, and the game never fails to twist and turn just when you feel the end is near.

An efficient, yet sometimes evasive, programming style combined with a great deal of thought earns this entry its proper place in the contest. I especially liked some of the references to real-life current events. Everyone who liked *Wargames* will certainly find themselves easily caught up in this one.

Dr. Carver is an editor at Chemical Abstracts Services, where he translates chemistry articles from Russian and German to English. He received his doctorate in physical chemistry from the University of Chicago in 1974.

CoCo 1/2 Graphics Best of Show goes to Mike Cooney, of Mansfield, Ohio, for his entry, *The Eye of the Opal.* You, Lwither, must find the special opal ring in order to make a proper proposal to Penelope. This requires what looks like an ordinary trip through an average sewer system (oh, boy!).

This Adventure is much more difficult than it might seem, but if you catch on to what Mike is doing, you will find it is really quite straightforward. The graphics are appropriate and some quite ornamental.

The Eye of the Opal starts out much like most other Adventures, but soon takes on its own character as surprise after surprise comes your way. And many aspects of the game are random, which always makes for fun, if frustrating, play.

Mike is a self-taught programmer and a junior in high school. In addition to his enthusiasm for computers, Mike's hobbies include art and music.

CoCo 1/2 Graphics Runner-Up goes to Paul Ruby, Jr., of Beeville, Texas, for *Foundation of Failure.* This 32K Adventure utilizes colorful `PMODE 3` graphics to illustrate the rather large labyrinth in which your character travels. Each of the 250 caverns is shown in perspective and may or may not contain one of the treasures you are seeking or an enemy you are trying to avoid.

The programming and presentation style is fairly original and lends itself well to this particular game. As you travel through the caverns in an attempt to save your village on the surface, you will learn to accept failure as well as triumph.

Paul is the founder of Ruby Software and Consulting, and he works with BASIC, *dBASE* and assembly language. His company consults with businesses about the creation and installation of accounting systems.

16K Best of Show goes to Chinarut Ruangchotvit, a 14-year-old from Ramsey, New Jersey, whose entry, *The Castle of Death*, can be found on Page 65. The complexity of this Adventure is hidden. Only as the game progresses do you begin to realize how lost you can get. Those of you who don't believe in mapping your travels, be warned. The programming style of this Adventure is typical of its size, but includes some new twists that other programmers can appreciate.

The story involves (as do many other Adventures) finding lost jewels. The solution is not readily apparent, but is, in fact, quite simple. Many traps await the Adventurer who becomes too greedy or obsessive.

I especially liked the addition of a descriptive term in some of the command lines. For example, since any room may have a door or window in several directions, the user can enter `OPEN LEFT DOOR` to open the door leading to the left. *The Castle of Death* serves as a useful model for those interested in learning how to create their own Adventures.

16K Runner-Up goes to Richard John Kottke, of Madison, Wisconsin, for his entry, *Captain Rodgers.* This two-part Adventure involves quite a bit

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Ron Hemenway
Tacoma, WA

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OS-9 Disk $49.95

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taking full advantage of the CoCo 3's cursor and function keys.

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by Scott Cabit

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of detail and realism. While it requires careful, logical thought on the part of the Adventurer, the play is very straightforward. The game takes you from a swamp to a space station if, of course, you manage to survive the little surprises along the way.

Richard is a midshipman in the naval ROTC unit at the University of Wisconsin, where his major course of study is electrical engineering. He aspires to join the Navy's nuclear power program upon graduation.

Non-Graphics Runner-Up goes to Stephen Berry, of Lake Jackson, Texas, for *Life: An Everyday Adventure*. The amount of work put into this large entry is quite obvious. And the goal of the Adventure, making your way through life, really hit home; it impressed upon me the things we take for granted and the work we do each day that we don't even recognize.

Life: An Everyday Adventure was designed for the CoCo 3 and requires a disk drive, but it certainly uses every bit of the resources available in such a system. The program represents an undertaking worthy of praise.

In real life, Stephen is a 17-year-old senior at Brazoswood High School.

Best in a Continuing Series goes to Fred D. Provoncha, of Lynbrook, New York, for *Aandark II*. (His original Adventure, *Aandark*, was a winner in The Third RAINBOW Adventure Contest.) This 32K Disk program details the continuing saga of the planet Aandark and its attack and occupation by the Dorax. You must disable the cannon in order for the Terran fleet to get through. I liked the first entry in this "series," and *Aandark II* provides the same level of enjoyment. It is well-written and well-deserving of our attention.

The Chase in the Park Award goes to Mike Anderson, of Tucson, Arizona, for *The Park of Mystery*, a 32K Adventure. In this Adventure, you have overheard a discussion between shady characters that "describes" where they have hidden their loot. You must find the money before they find it . . . or you. You must keep your "happy face" on while playing. Getting too serious just might spoil your chances for success. I believe *The Park of Mystery* exemplifies a programming style and efficiency we all could strive for. Mike is a return winner. His entry, *The Adventure of Johnny Zero*, was a winner in The Third RAINBOW Adventure Contest.

The Halloween Revisited Award is won by David Bartmess, of Fayetteville, Pennsylvania, for *Ghost House*. David must have a passion for haunted houses and those neat little scares. This 16K text Adventure invites you to try to find various treasures located in the ghost house. A very handy and unique aspect of the game is its ability to accept multiple commands on one line. I thought this ability was interesting — it is good to see novel ideas incorporated into such software.

The Sleeper Award goes to Tio Babich, of Miller Place, New York. His entry, *The Parlog Building*, is a 32K text Adventure in which you are trapped on a military base. Your only goal is to escape unharmed. It is just a little trickier than imagined, though. The input routine on this game allows you to enter fully descriptive commands or shorten them to a simple noun/verb combination. *The Parlog Building* is a good warm-up Adventure for the hardy Adventurers and an excellent learning tool for novices.

The Space Wars Awards goes to Andre Needham for his work on *General Panic*. Andre, who lives in Renton, Washington, has put together quite a sophisticated 16K text Adventure in this entry. Your goal is to retrieve some antimatter necessary for the Earth's power. This is a "typical" Adventure with a good story line. It is well-written and should be enjoyable to most any Adventurer.

The Architect of the Year Award goes to Eric Santanen, of Stanhope, New Jersey, for *House Adventure*. Essentially, you are stuck in an old, abandoned house and must find a way out. But this house is quite a bit more complex than it seems. Eric took special care in writing this 32K text Adventure to make sure the solution could not be discovered before the game was played (unless you had the solution sheet, like me!). This game is rather involved, but once you discover the solution, the trials and tribulations begin to make sense.

The Flipper Award goes to Ken Lie, from Gates Mills, Ohio. Ken's entry, *Operation: Ocean Master*, involves quite a bit of "spook" stuff (I do love the underworld and the enchanting image of intrigue offered by "special operations"). In this 32K text Adventure, you are a special operations agent assigned to uncover the mystery of recent underwater volcanic activity and how it is related to changes in the songs of humpback whales. Sounds simple, doesn't it? Try again. This is just the tip of the iceberg. I really appreciated the sudden twists in the plot of this Adventure. Also, Ken has done an excellent job of hiding the "real" objective beneath a web of mystery.

Honorable Mention goes to Chris Cuthill for his work on *Power Search*. In this Adventure you are leading an expedition to find the last remaining sources of uranium. It is vital you succeed, since the Earth has become totally dependent on nuclear energy (the year: 3010).

The realism of this Adventure is such that you must enter actual coordinates (latitude, longitude and altitude) in order to travel during your search. Your success is based on your ability to calculate locations. Chris included several global maps and a scaled ruler for this purpose.

Unfortunately, the requirement of the detailed maps makes this excellent Adventure unfeasible as a candidate for publication. However, it by no means lessens the entertainment or educational value of the game.

Chris is 15 years old and is currently attending Grimsby Secondary School in Ontario, Canada.

Honorable Mention goes to Jeff Johnson, of Orlando, Florida, for *Superspy*. This 32K Adventure is by no means easy. The player must infer several "normal" daily activities throughout the game. Perhaps the most frustrating, yet captivating, aspect of *Superspy* is that the objective is unknown at the start of the game. This one is definitely not for the light-hearted Adventurer.

The winning Adventures represent only a small sampling of the entries we received in The Fourth RAINBOW Adventure Contest. They represent what I see as the "cream of the crop." The winners will be further honored by being published in *The Fourth Rainbow Book of Adventures*, which will be available in the near future.

While I would like to mention each and every Adventure, it would not be possible. And to list some of the "better" entries isn't really fair in my mind. Each Adventure had its own special quality I was drawn to. No one has "lost" — we have all gained.

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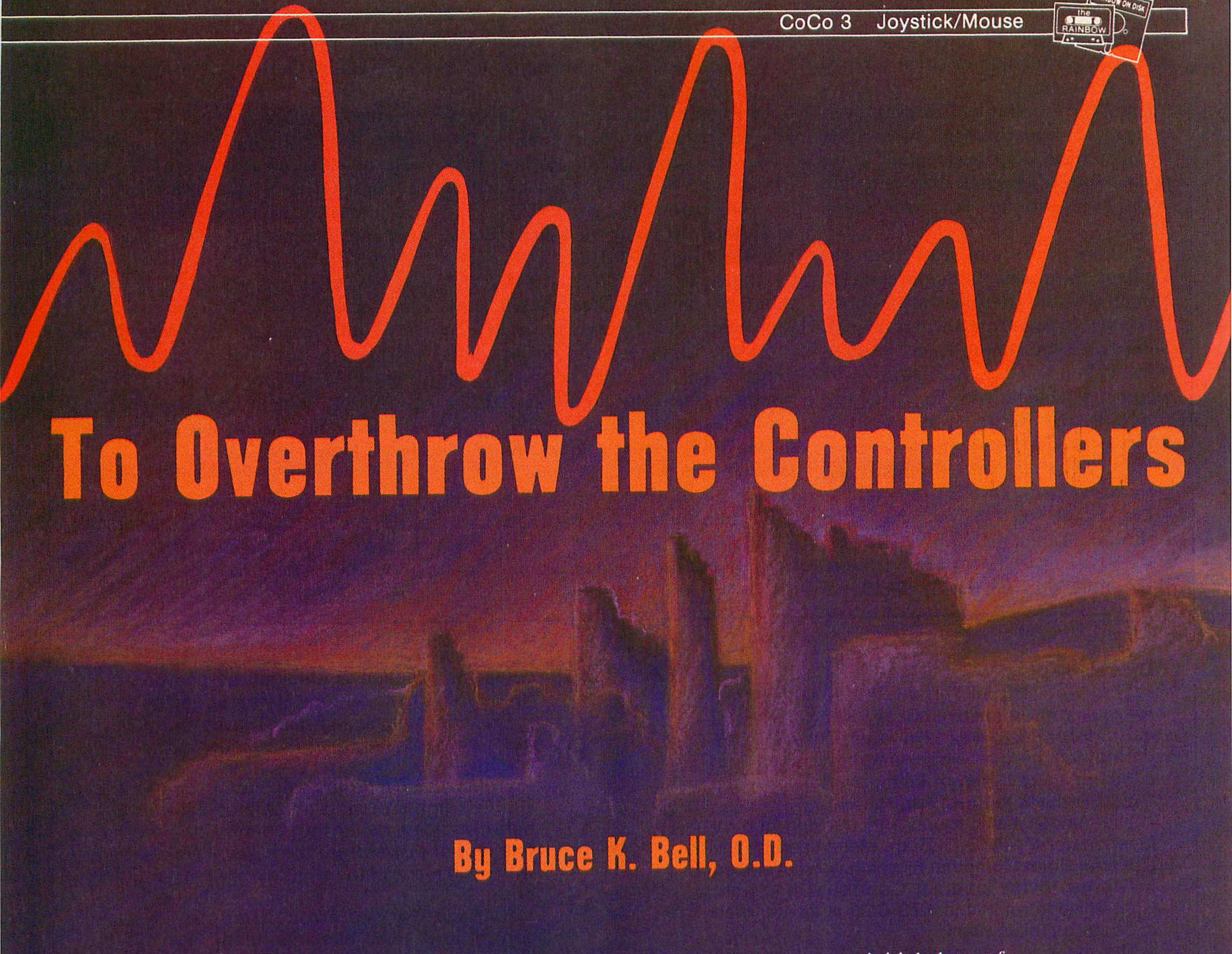

To Overthrow the Controllers

By Bruce K. Bell, O.D.

From the crest of the hill you can see the deserted city ahead. It is hard to imagine that only four years ago the city teemed with human life. But that was before the Controllers came.

Banning all men to rural life — for their own good, of course — the Controllers systematically destroyed all of Earth's cities. This city was one of the last to be eliminated. Industrious as you are, you want to scavenge for artifacts to sell to collectors, an activity tolerated by the ruling race.

You respect the wisdom of the Controllers — after all, they traveled halfway across the galaxy to make all mankind understand that the old way of life, spent in corrupt pursuit of technological advances, threatened the Plan. After having put up an initial show of resistance, most people understood that they were better off under the rule of the new masters.

There has been some talk of a resistance group, but you rather doubt it. After all, who would want to revert to a primitive and heretical way of life? Just the same, you are curious to see for one last time the remnants of a civilization you only vaguely remember.

As you search the ruins, you find an odd-looking shuttle barely large enough to hold one person. Looking in, you see an old *magazine* on the seat with the word "RAINBOW" printed on the front. Immediately you recognize this as the technological poison of which your masters have warned you. But, surely, it would not hurt to look — after all, *you* would not succumb to primitive heresy. You reach for the magazine and flip through it. You see that someone or something named Falsoft had established a West Coast branch in this city.

Bruce Bell practices optometry in his hometown of Rockmart, Georgia. He spends hours using programs he finds in THE RAINBOW *and programming his CoCo for use in his office and at home.*

Pressed between the pages is a small *booklet* — a manual of some sort. At once, you recognize it as an operations manual for the shuttle. Curiosity overtaking you, you climb in for a closer look, and the door accidentally shuts behind you. You become dizzy and your vision grays. Minutes later your senses return . . .

It is clear to you now that the Controllers are able to manipulate the human will and that the shuttle somehow shields you from their influence. You realize you cannot leave the shuttle. And you wonder if there are others who know what you do. This you must find out and, if any way possible, *destroy the Controllers*!

As the sun sets over the bent city, you pore over the shuttle's manual . . .

Looking the shuttle over, you notice all holding tanks are empty. The gun is gone! You must do your best in spite of all odds. Your mission is clear!

Setting Up for Game Play

You need a Color Computer 3 (128K minimum) and a joystick or a mouse. Type in both listings and save them. If you are saving on cassette, save `CONTROL` first and `CNTRL` immediately following. You will need to enter `PCLEAR1` before typing in `CNTRL`.

To load the game on a disk system, just enter `RUN "CONTROL"`. On a tape system, enter `CLOAD "CONTROL"`. After the program has loaded from tape, enter `RUN`. When prompted to press the firebutton, do so and also depress the Play button on the tape recorder. The tape should already be positioned just before the main program, `CNTRL`. This program will automatically be loaded for you. When it has finished, simply enter `RUN` a second time and the game will start.

Either the right or left joystick may be used, but use the same one throughout the game.

Hints

Examine every location and identify every object. This is an advanced Adventure requiring wit and skill to complete. Therefore, save your place often! The object of the Adventure is twofold: trying to destroy the Controllers, and accumulating as much wealth as possible. You'll need it in the aftermath of the Controller's defeat. As much as $2,101,000 in treasure lies hidden in the landscape of the Adventure.

Should you accidentally press BREAK during game play, type `GOSUB 295:HSCREEN2:CONT` to reset.

In this battle you have become a soldier — a soldier of fate and fortune! Good luck — you'll need it!

(Questions or comments regarding this Adventure may be directed to the author at 137 Samanda Circle, Rockmart, Georgia 30153. Please enclose an SASE when requesting a reply.) ☐

Operations

The ATS-CC5 All Terrain Shuttle is designed for maximum maneuverability over all types of earthen terrain, as well as in water. The ATS-CC5 employs a unique electromagnetic shell that eliminates any threat of being overtaken by the Controllers via thought control.

The various background and tracking control functions of the ATS-CC5 are maintained by the powerful Color Computer 5, which was developed just prior to the original Controller invasion. Operator control of the ATS-CC5 is also carried *out through* this system.

The main console of the ATS-CC5 allows the single occupant complete control of all shuttle operations. The individual controls are described starting from the upper-left corner and proceeding in a clockwise fashion around the panel.

Digital View Screen (DVS)

The large view screen displays a digitized video image of the forward surroundings exterior to the shuttle. It is important to note that the image you see is a digital representation and therefore caution must be used in placing objects outside the craft. Objects that are similar in color to the exterior background may be difficult to see later.

Command Center

The 10 function buttons (two rows of five) on the right side of the control panel are used to engage the shuttle's inherent commands. Moving the joystick (or mouse) selects the function marked by a small blue light in the upper left-hand corner of the button. The light glows red

8 ATS-CC5 Operations Manual

when the function is engaged by pressing the firebutton. These buttons are described below.

Examine (magnifying glass) gives you a brief description of the area immediately outside the shuttle.

Lights On/Off (light with rays) toggles the shuttle's lights on and off. A blue light on this button indicates when the lights are on. Note that one unit of power from the battery is expended with each move of the shuttle while the lights are on.

Retrieve/Get (up arrow) transfers joystick control to a small blinking cursor in the DVS. Move the cursor over an object you desire to retrieve and press the firebutton. The object will appear in the holding tanks below. To leave this mode without getting an object, move the cursor to an area of the DVS containing no obtainable object and press the firebutton.

Release/Drop (down arrow) selects the target for release from the craft. When you press this button, you will see a small blue light appear on one of the holding tank monitors in the lower part of the control panel. Move the joystick and press the firebutton and the object will appear in the DVS.

Use (hand with index finger extended) analyzes a target to determine its purpose. Press this button and then select the object in the holding tanks you want to use (as described under Release). Use is a multipurpose function and therefore quite powerful. Since the shuttle is controlled by the powerful Color Computer 5, analyzing a target is simple. Therefore, to `USE SANDWICH` *will result in the* sandwich being eaten. `USE BAT` is synonymous with swinging the bat. `USE GAS` to fill your tanks or `USE`

ATS-CC5 Operations Manual 9

40	19	170	37
70	204	195	215
105	155	225	70
125	223	END	224

Listing 1: CONTROL

```
0 'THE CONTROLLERS 1.0, "CONTROL
" - BOOT PROGRAM, (C) 1987 BRUCE
 BELL, This program is avaialabl
e "as is" and is nonwarranted!
5 CLEAR500:PCLEAR5:PMODE3,2:WIDT
H32:ATTR0,0:MP=PEEK(188)*256
10 PRINT"THE CONTROLLERS 1.0","C
OPYRIGHT (C) 1987 BRUCE BELL","C
OCO3 128K",,,,"MONITOR TYPE",,:I
NPUT"1. CMP (TV)    2. RGB ";Q$:Q
=VAL(Q$):IFQ<1ORQ>2THEN5ELSEPOKE
MP+86,Q-1
15 PRINT:PRINT"LOADING METHOD",,
:INPUT"1. DISK   2. TAPE ";Q$:Q=
VAL(Q$):IFQ<1ORQ>2THEN15ELSEPOKE
MP+87,Q-1:PRINT:PRINT"PRESS YOUR
 FIRE BUTTON"
20 IFBUTTON(0)THENQ=0ELSEIFBUTTO
N(2)THENQ=2ELSE20
25 POKEMP+88,Q:WIDTH40
30 PRINT"   While scavenging a w
est coast city  which will be d
estroyed by your masters,the Con
trollers, you find an odd lookin
gshuttle large enough to hold on
ly one   person. Climbing in, th
e door accident- ally shuts behi
nd you. You become dizzy"
35 PRINT"as your vision greys. M
inutes later yoursenses return..
."
40 PRINT:PRINT"   It is clear to
 you now that the Con- trollers
are able to manipulate the hu- m
an will. Somehow the shuttle mus
t      shield you from this."
45 PRINT:PRINT"   You cannot lea
```

BATTERY to restore your power systems. The USE function is limited only by your imagination.

Identify (question mark) describes an object in the holding tanks. Since all images in the holding tanks are digital images, low relative resolution may make an object unidentifiable by sight alone. Using the power of the CoCo 5, you can select an object in the holding tanks (by pressing the ? switch) and it will be described.

Score (double arrows) displays your current score and assets. The score represents the number of moves you've made from one location to another. Other commands do not add to your score. Of course, the lower your score and the higher your assets, the better you've played.

Map (diamond shape) displays a map of your travels on the screen. In each position you've been, a hexadecimal number from $1 to $F appears. Each number represents the exits available from that position. A legend below the map describes this directional code. Your current position blinks on the map. Using your joystick, you may move the line cursor around the map. The location and any objects left in that position (of only the locations you've been) appear below the map. To exit the map, press the firebutton.

Save/Load saves your place. Prepare the tape or disk and answer the prompts, pressing S or L for Save or Load, respectively and T, D, or A for Tape, Disk or Abort, respectively.

Quit (hexagon) allows you to end your travels in the ATS CC5 (i.e., quit the game).

Locomotion

The ATS-CC5 is moved by pressing the large rocker switch below the command center. The letters N, S, E and W light up, signifying which of the four directions (North, South, East and West) you may go. Move the blue indicator to the desired direction and press the firebutton.

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Fuel and Battery Indicators

One unit of fuel is used with each move. The ATS-CC5's battery is used to power the exterior lights as well as its laser gun and force field. Depending on the laser intensity, the gun uses one or two units of power with each firing. The laser's intensity is automatically set and may not be adjusted manually. The force field (engaged automatically) uses one unit of power for each hit it receives, and one unit of power is expended with each move while the shuttle's lights are on.

Holding Tanks

There are five holding tanks for objects brought into the ATS-CC5. Digital images appear on the miniature DVSs below the screen. Indicator lights glow blue when selected and red when engaged (firebutton is pushed). The smaller button to the right of Tank 5 is for exiting without selecting one of the monitors.

There is a separate holding tank for any treasures you may find. These are not displayed on the control panel. Hence, you may retrieve treasure even when your holding tanks are full.

Laser Gun

The laser gun may be held in any of the five holding tanks. When there is danger, the gun is automatically engaged. It may also be engaged manually with a USE GUN command.

ATS-CC5 Operations Manual 11

```
ve the shuttle!  Are  there oth
ers who know what you do? Theset
hings you must find out and if a
ny way possible - destroy..."
50 FORK=MP TO MP+82:READA$:POKEK
,VAL("&H"+A$):NEXT
55 DATA10,8E,DD,DD,86,70,B7,FF,A
1,4C,B7,FF,A2,8E,5F,BF,AF,8D,0,1
B,8E,24,64,8D,3,16,0,2A,5F,10,AF
,81,5C,C1,3C,2D,F8,30,88,28,AC,8
D
60 DATA0,3,2D,EE,39,0,0,10,8E,22
,22,86,72,B7,FF,A2,8E,5E,60,AF,8
D,FF,EE,8E,46,A4,8D,D6,86,79,B7,
FF,A1,4C,B7,FF,A2,B7,FF,A2,39
65 FORK=MP+91 TO MP+150:READA$:V
=VAL("&H"+A$):POKEK,V:POKEK+60,V
:NEXT
70 DATA86,70,B7,FF,A1,4C,B7,FF,A
2,CE,0,A,8E,24,DB,10,8E,0,77,E6,
84,30,1F,A6,84,A7,1,31,3F,26,F6,
E7,84,30,89,1,L7,8C,5F,BF,2D.E5.
33,5F,11,83,0,0,26,DA,86,79,B7,F
F,A1,4C,B7,FF,A2,39
75 POKEMP+165,&H64:POKEMP+173,1:
POKEMP+177,&H1F:POKEMP+185,&H88:
POKEMP+186,&H29:POKEMP+187,&H12
80 FORK=MP+211 TO MP+251:READA$:
POKEK,VAL("&H"+A$):NEXT
85 DATA86,70,B7,FF,A2,8E,44,DB,E
6,84,10,8E,0,77,30,1F,A6,84,A7,1
,31,3F,26,F6,E7,84,30,89,1,17,8C
,52,9B,2D,E5,86,7A,B7,FF,A2,39
90 FORK=MP+252 TO MP+650STEP2:RE
ADR,A$:POKEK,R:POKEK+1,VAL("&H"+
A$):NEXT
95 DATA29,22,29,23,29,23,29,23,2
9,27,29,23,29,23,29,23,29,23,29,
21,2,6,2,3,2,3,2,3,2,3,2,3,2,3,2
,3,5,5,6,21,30,2C,30,27,30,2D,27
,16,28,3,27,15,1,22,3,27,1,23,1,
25,1,2A,1,23,1,23,1,23,1,23,1,25
,2,6,2,3,7,9,8,21
100 DATA30,2A,30,2B,31,29,27,1A,
27,17,32,1F,26,11,4,2A,3,23,1,2B
,1,63,1,23,1,27,1,23,1,23,1,2D,2
,E,2,3,9,1,10,21,25,16,25,13,25,
13,25,13,32,1B,32,19,26,16,20,17
,20,17,20,17,20,17,20,15,1,2A,1,
23,1,23,1,29,2,E,2,7,2,7,2,5
105 DATA25,1E,25,13,20,13,23,17,
24,7,23,15,15,A,15,B,15,B,15,B,1
5,B,14,1F,14,17,14,17,12,17,12,1
7,11,1F,11,1F,11,1F,11,1D,25,1A,
25,13,20,13,23,1B,23,1B,23,1D,16
,16,16,17,16,17,16,17,16,15,14,1
E,14,1F,14,1F,12,1F,12,1F,11,1F,
11,1F,11,1F,11,1D
110 DATA21,16,21,17,21,17,21,13,
21,13,22,11,16,1E,16,1B,16,1B,16
,1B,16,19,14,1E,14,1F,14,1F,12,1
F,13,0,12,1F,12,1F,12,1F,12,1D,2
6,1A,20,1B,20,1B,20,13,20,13,19,
15,17,18,18,23,18,23,18,23,18,25
,14,1E,14,1F,14,1F,12,1F,12,1F,1
3,0,12,1F,12,1F,12,1D
115 DATA19,16,19,17,19,17,19,13,
19,13,19,19,18,26,18,25,18,26,18
,27,18,2D,14,1E,14,1F,14,1F,14,1
F,14,1F,14,1F,14,1F,14,1F,14,1D,
19,1A,19,1B,19,1B,19,13,19,13,19
,13,18,2B,18,2B,18,29,18,2A,18,2
9,14,1A,14,1B,14,1B,14,1B,14,1B,
14,1B,14,1B,33,1B,14,19
120 IFPEEK(MP+86)THENPALETTERGB:
PALETTE5,56:PALETTE7,0:PALETTE13
,56:PALETTE14,7ELSEPALETTECMP:PA
LETTE5,32:PALETTE7,0:PALETTE13,3
2:PALETTE14,16
125 PCLS2:DRAW"BM8,136C1U88R240C
8D88L240BE8R4U4BHC1L4D4BU68U4R4B
FC8D4L4BR222R4U4BHC1L4D4BD68U4R4
BFC8D4L4BM30,80":A=MP+652
130 GOSUB250:GOSUB135:GOSUB255:G
OSUB135:GOTO145
135 FORK=1TO197:POKEA,ASC(MID$(A
$,K,1)):A=A+1:IFMID$(A$,K,1)="C"
THENIFMID$(A$,K+1,1)="1"THENK=K+
1:POKEA,52:A=A+1
140 NEXT:DRAWA$:RETURN
145 A$="Lonnie, Marty, and Tony
left seven days ago to test the
shuttle you're in. We  haven't
heard from them since. This
building is shielded as is your
shuttle and we can't leave. See
if you can find them!"+CHR$(13)+
"J. KAPFHAMMER"
150 A=MP+1046:FORK=1TO219:POKEA,
ASC(MID$(A$,K,1)):A=A+1:NEXT
155 FORK=MP+1265TOMP+1534:READA$
:POKEK,VAL("&H"+A$):NEXT
160 DATA42,79,20,64,69,73,63,6F,
6E,6E,65,63,74,69,6E,67,20,74,68
,65,69,72,20,70,6F,77,65,72,20,7
3,75,70,70,6C,79,20,79,6F,75,20,
68,61,76,65,20,64,65,73,74,72,6F
,79,65,64
165 DATA20,74,68,65,20,43,4F,4E,
54,52,4F,4C,4C,45,52,53,21,20,54
,68,65,20,43,6F,6E,2D,74,72,6F,6
C,6C,65,72,73,20,61,72,65,20,61,
20,72,61,63,65,20,6F,66,20,6D,61
,63,68,69
170 DATA6E,65,73,20,77,68,6F,20,
66,65,61,72,74,68,65,20,63,6F,6D
,70,75,74,65,72,73,20,73,65,6E,7
4,69,65,6E,74,20,62,65,69,6E,67,
73,20,64,65,76,69,73,65,20,73,6F
,D,74,68
175 DATA65,79,20,65,6E,73,6C,61,
76,65,20,74,68,65,6D,20,61,6E,64
```

```
,20,64,65,73,74,72,6F,79,20,74,6
8,65,69,72,20,63,6F,6D,2D,70,75,
74,65,72,73,2E,20,41,73,20,75,73
,75,61,6C
180 DATA20,74,68,65,20,43,4F,43,
4F,20,77,61,73,27,6E,74,20,74,61
,6B,65,6E,D,73,65,72,69,6F,75,73
,6C,79,2D,20,62,75,74,20,74,6F,2
0,74,68,65,69,72,20,64,65,6D,69,
73,65,21
185 WIDTH32:SCREEN1,1:FORK=30TO0
STEP-5:PLAY"L255O1;V=K;1;2;3;6;4
;8;9;11;3;2;12;3;2;1;V30":NEXT:P
OKE65497,0
190 HSCREEN2:HSCREEN0:POKE&HE6,2
:POKE&HE6C6,18:POKE&HE6C7,18:HCO
LOR0,0:HCLS14
195 HDRAW"BM0,108S4C3U108R255D10
8L255EU106R253D106L253E C8U104R2
51GL249D102EU100R247 C13D100L247
GR249U102ED104L251"
200 FORX=287TO317STEP30:FORY=2TO
106STEP23:HDRAW"BM=X;,=Y;C8D20L2
5ER23U18 C13L23D17R22U17 BEC4L24
D19C13":HPAINT(X-4,Y+4),13,13:NE
XTY,X
205 HDRAW"BM271,13C4NG6U8R10 C8D
8L9G5 BR29BU6C4NF6E6C8BFF2D6NG2B
R3F2C4BUH2BU3R4BDC8L4BU3E2BUC4G2
 BD20BL9NR10D7L2F7 C8E7L2U7 BL35
F7L2D7L10 C4U7L2E7 BD36BL6H2U4E2
R9U4ER2 C8FD10G2BU7BL2D2BL4U2BL4
D2
210 HDRAW"BR32BD6R2U2BU2NL2U2R8U
8 C4L12D4 C8R2U2R8 C4D4L8D3BD3ND
R BD12BRC8F6G6C4H6E6BFBDD8BL2C8U
8 BL34BU2F6G6BR6E6H6C4D12BL6U12
BD23BRND12R12BD4L2BL2BGD2L2 C8U2
R2BR2BEU2R2U2BD4D8L12 BR33BUR4E4
U3H4C4L4G4D3F3
215 HDRAW"BM266,160C13U42R48D42L
48 C4GU44R50 C8D44L50":HPAINT(27
2,155),13,13:HDRAW"BM290,140C4LU
RBERBFRBD C8LBGLBD8H10E10 C4F10G
10":HPRINT(36,15),"N":HPRINT(34,
17),"W":HPRINT(38,17),"E":HPRINT
(36,19),"S"
220 HDRAW"BM234,166C4L14D24EU22R
12C8D22L12GR14U24BG2C13D20L10U20
R10":HPAINT(230,170),13,13
225 HDRAW"BM245,176C13R8HL6UR6UL
6UR6UL6U4R6D4R2D2FREU4LFH2 BM245
,188R10UL10UR10UL10UR10UL10ERBR6
RC8BD3L2BL5NUNRNDNL BM317,166C4D
10L55C8U10R55BGC13D8L53U8R53BD14
D8L53U8R53BEC4D10L55C8U10R55":HP
AINT(310,170),8,13:HPAINT(310,18
3),8,13
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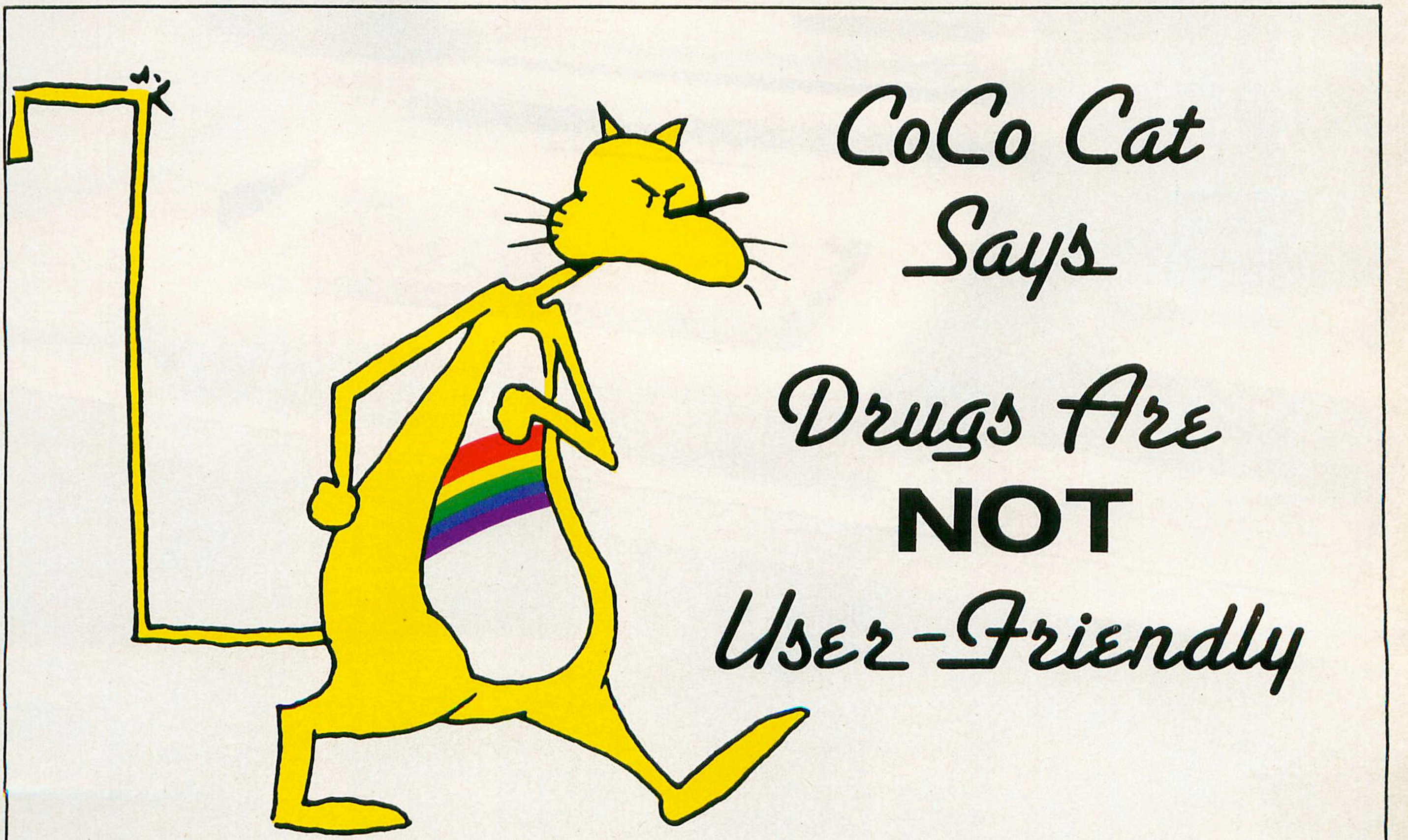
```
230 FORX=2TO178STEP44:HDRAW"BM=X
;,164C4D26RU26R34D26LNU26L34BE C
13R32U24GD22L30 C8U23R32GL30D21
C8BR34BU23D28L34C4":FORC=0TO4:HC
OLORC,0:HLINE(X+5+C*5,167)-(X+10
+C*5,186),PSET,BF:NEXTC,X
235 HDRAW"BM2,112C1R254D48L254U4
9R255D50L256U10NR255U40":HPAINT(
12,150),2,1:HCOLOR13,2:HPRINT(6,
19),"/// COLOR COMPUTER 5"
240 HDRAW"BM30,40S4":GOSUB250:HD
RAWA$:GOSUB255:HDRAWA$:HSCREEN2:
PMODE0,1:PCLEAR1
245 POKE65496,0:IFPEEK(PEEK(188)
*256+87)THENWIDTH40:PRINT:PRINT"
Type RUN when you see the OK.":C
LOAD"CNTRL"ELSERUN"CNTRL",R
250 A$="C1U6C8L2C1U4R8C8D4L2D6L4
BR8R4U4R2C1D4C8R4U10C1L4D4L2C8U4
C1L4D9BDBR12U10R8C8D2L4D2C1R4C8D
2L4D2C1R4C8D2L8BG22S8C1U10R8C8D4
L5D2C1R5C8D4L8BR9R8U10C1L8D10BR9
U10R3C8F2C1U2R3C8D10L3C1H2C8D2L3
BR10R6U6RU4C1":RETURN
255 A$="L8D4C8RC1D6BR8U10R8C8D8L
2F2L3C1H2C8D2L3BR9R8U10C1L8D10BR
9U10R6C8D4C1R2C8D6L8BR9R8U6C1L2C
8U4C1L6D10BR9U10R8C8D2L4DC1R4C8D
4L4DC1R4C8D2L8BR9R3U2C1F2C8R3H2R
2U8C1L8D10BR9U2R4UC8L4C1U7R8C8D2
L4DC1R4C8D7L8":RETURN
```

55	55	540	141	900	209
125	3	570	209	945	55
170	243	610	234	965	109
205	200	650	67	1005	111
270	79	690	83	1025	47
300	206	730	38	1060	205
340	82	760	253	1080	223
365	60	790	186	1140	223
410	196	830	139	1200	79
425	140	850	75	1230	104
475	168	880	33	END	103
505	73				

Listing 2: CNTRL

```
0 'THE CONTROLLERS 1.0, "CNTRL"
- MAIN PROGRAM, (C) 1987 BRUCE B
ELL, This program is available "
as is" and is nonwarranted!
5 GOSUB295:DIMR$(34),O$(29),A(20
0),R(200),D(3),O(35)
10 POKE65497,0:HSCREEN2:F1=PEEK(
188)*256:F2=F1+49:M1=F1+91:M2=F1
+151:M3=F1+211:P1=F1+2:P2=F1+3:E
XECF2:HCOLOR4,0:HPRINT(1,16),"On
e moment please":FORA=0TO4:GOSUB
230:NEXT:GOSUB160:GOSUB1210
15 V(5)=48:V(6)=48
20 LO=1:L=1:GOSUB200:GOTO440
25 D=0:IF(A(R)AND32)=32THENIFL=0
THEND=1:GOTO1105ELSEIFL=1ANDV(6)
<1THEND=1:GOTO1105
30 IFPR<>R THENONR(R)GOSUB710,72
0,710,1060,720,805,720,830,720,8
40,755,770,1050,790,855,865,365,
885,895,925,975,975,990,955,925,
925,945,955,1005,1015,1040,330,7
90,770
35 IF(A(R)AND128)=128GOSUB150
40 FORO=0TO35:IFO(O)=R GOSUB175:
NEXTELSENEXT
45 FORK=0TO3:IF(D(K)ANDA(R))=D(K
)THENHCOLOR4,0ELSEHCOLOR13,0
50 ONK GOTO55,60,65:HPRINT(36,15
),"N":GOTO70
55 HPRINT(36,19),"S":GOTO70
60 HPRINT(38,17),"E":GOTO70
65 HPRINT(34,17),"W"
70 NEXT
75 R$=R$(R(R))
80 GOSUB215
85 IF(A(R)AND16)=16THENM=1ELSEM=
0
90 IFLZ=1THENLZ=0:IF(A(R)AND32)=
32THENL=1:LO=1:GOTO440
95 CD=0
100 HDRAW"BM=JX;,=JY;C2RDLU"
105 IFM THENEXECM3:IFR=147THENC=
0:FORK=9TO11:A=((A+1)AND3):C=7+A
:PALETTEK,C:NEXT
110 IFBUTTON(BU)THEN130ELSEH=JOY
STK(0):H=JOYSTK(JH):V=JOYSTK(JV)
:IFH1=H ANDV1=V THEN105ELSEH1=H:
V1=V
115 POKE65497,0:GOSUB170
120 IFCD=0THENIFV<40THENJX=INT(H
/32)*30+264:JY=INT(V/8)*23+4:GOT
O100ELSEIFV<48THENJX=285:JY=122:
GOTO100ELSEIFV>55THENJX=285:JY=1
54:GOTO100ELSEJX=INT(H/32)*41+26
9:JY=139:GOTO100
125 JX=INT(H/10.7)*44+33:JY=188:
IFJX>209THENJX=230:JY=187:GOTO10
0ELSE100
130 IFR=147GOSUB160
135 HDRAW"BM=JX;,=JY;C3RDLU":PLA
Y"L200O3ABC":IFCD=0THENCD=INT(H/
32)+INT(V/8)*2+1:XJ=JX:YJ=JY:ONC
D GOTO405,440,445,485,490,620,62
5,630,675,700,300,300,305,310,31
5,315:GOTO95
140 A=INT(H/10.7):RETURN
145 GOSUB170:JX=XJ:JY=YJ:CD=0:IF
```

```
W THENW=0:GOTO45ELSE115
150 IFR=126THENHCOLOR11,0:HLINE(
83,38)-(151,80),PSET,BF:RETURNEL
SEIFR(R)=15THENHCOLOR13,0:HLINE(
50,7)-(100,60),PSET,BF:RETURNELS
EHDRAW"BM24,28C8E10F8E8F10R14G14
L8G8H8L6H6E4H4":HPAINT(34,34),8,
8:RETURN:'BREAK WINDOW
155 HCOLOR10,8:HLINE(110,14)-(15
0,70),PSET,BF:HDRAW"BM127,18C4L1
1D25C8R11U25BR18D25L11C4U25R11BD
31L11D16C8R11U16BL18D16L11C4U16R
11BL12BUH2E2C8BM151,14C8D56L40GR
42U58C4L42D58EU56R40":RETURN:'DO
OR
160 IFPEEK(F1+86)THENPALETTERGB:
PALETTE5,22:PALETTE9,32:PALETTE1
0,53:PALETTE11,8:PALETTE12,25:PA
LETTE13,56:PALETTE14,7:PALETTE15
,20ELSEPALETTECMP:PALETTE5,33:PA
LETTE9,5:PALETTE10,20:PALETTE11,
13:PALETTE12,45:PALETTE13,32:PAL
ETTE14,16:PALETTE15,1
165 RETURN
170 HDRAW"BM=JX;,=JY;C13RDLU":RE
TURN:'INDICATORS OFF
175 IFD THENRETURNELSEOG=O:IFO<9
THENOX=8+O*26:OY=80ELSEIFO<15THE
NOX=8+(O-9)*26:OY=100ELSEIFO<23T
HENOX=164:OY=100:OG=15ELSEIFO<30
THENOX=190:OY=100:OG=16ELSEOX=21
6:OY=100:OG=17
180 IFHP THENHPUT(OX,OY)-(OX+26,
OY-23),OG+2,PSET:HP=0:RETURNELSE
HGET(OX,OY)-(OX+26,OY-23),OG+2
185 HDRAW"BM=OX;,=OY;":ONOG+1GOS
UB1135,1120,1160,1115,1155,1195,
1200,1145,1125,1175,1130,1180,11
40,1185,1170,1165,1150,1190:RETU
RN:'DROP
190 FORO=0TO35:IFO(O)=PR THENHP=
1:GOSUB175
195 NEXT:RETURN:'PLACE OBJECT
200 HDRAW"BM266,171C8R48DL48UC6R
=V(5);DL=V(5);":V(5)=V(5)-1:IFV(
5)<1THENV(5)=0:GOSUB215:HPRINT(1
,17),"OUT OF GAS!":RETURNELSEIFL
=0THENRETURN
205 HDRAW"BM266,185C8R48DL48UC7R
=V(6);DL=V(6);":V(6)=V(6)-1:IFV(
6)<1THENV(6)=0:GOSUB215:HPRINT(1
,17),"BATTERY DEAD!":LZ=1:RETURN
ELSERETURN
210 C=0:FORX=0TO30STEP5:C=C+1:FO
RY=1TO5:HCIRCLE(128,62),X+Y,C,1,
.5,1:NEXTY,X:RETURN
215 EXECF2:HCOLOR4,0:HPRINT(1,15
),"LOCATION: "+R$:RETURN:'CLEAR
```



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Tandy Computers:
Because there is
no better value.™

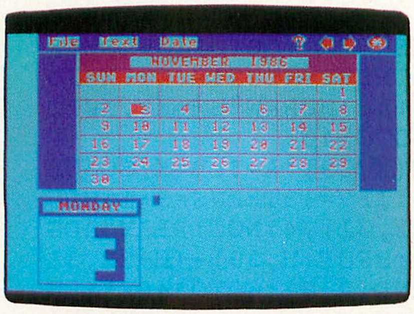
Tandy® Color Computer 3 Disk System

Superb graphics and uncompromising performance at an incredible price.

Here's a powerful, low-cost system that does it all. The Color Computer 3 (26-3334, $199.95) is a computer you can put to work right away for word processing, creating graphs and illustrations, spreadsheet analysis, budgeting—even writing your own programs! And it's expandable, too.

Disk drive power and flexibility

Get the most out of your Color Computer with the Color Computer Disk Drive (26-3133, $299.95). With this easy-to-connect drive, you can write your own sophisticated disk applications or utilize ready-to-run software on popular 5¼″ diskettes. We offer a wide selection of software—the number of applications is almost limitless.



NOVEMBER 1986

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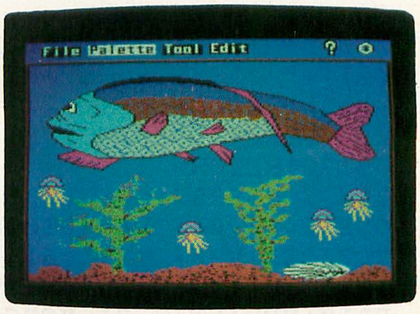
DeskMate 3™ seven-in-one software

Best of all, we've got a low-priced software package that may be all you ever need: DeskMate 3 (26-3262, $99.95). It's easy to use because there are no complicated commands to memorize, and the program itself actually guides you along with prompts at each step.

DeskMate 3 is an integrated program including *Text* word processing, a general-purpose text-entry and editing program. *Text* performs search and replace, file merge, and block select, copy and delete. *Ledger* is a simple spreadsheet which includes an easy-to-use menu and automatic column formatting. *Index Cards* filing comes in handy as a personal filing system—it actually eliminates mounds of paperwork and records. *Index Cards* also allows you to enter and edit data and perform sorts and searches. Using *Paint*, you can create colorful charts, graphs and designs. *Calendar* is a simple monthly planner that allows you to list "to do's" for any date. *Calculator* has four functions for quick and easy calculations. With the included *Telecom* telecommunications program, you can access national information banks or send messages to other computers.

See what you've been missing

The Color Computer 3 offers better graphics than any previous Color Computer. Simply connect the Color Computer 3 to the CM-8 high-resolution monitor (26-3215, $299.95), and you can create incredibly detailed charts and graphs, make engineering drawings in vivid colors, or form simple sketches. Choose 160 × 192 or 320 × 192-resolution with 16 colors, or display 640 × 192 graphics and 4 colors. Extended BASIC language commands let you alternate screens, colors and backgrounds at a higher resolution, and you can choose from a palette of 64 colors.



Come in today!

Stop by your local Radio Shack and get the power of a full, disk-based system. The Color Computer 3 delivers professional performance—for less.

Price apply at Radio Shack Computer Centers and participating stores and dealers. DeskMate 3 telecommunications require modem.

Radio Shack®
The Technology Store™
A DIVISION OF TANDY CORPORATION

```
MESSAGE
220 GOSUB215:HPRINT(1,17),"Selec
t desired object":RETURN:'MONITO
R MESSAGE
225 GOSUB215:HPRINT(1,17),"Abort
 Command":SOUND50,1:RETURN:'ABOR
T MESSAGE
230 FORC=0TO4:HCOLORC,0:B=A*44+7
+C*5:HLINE(B,167)-(B+5,186),PSET
,BF:NEXT:RETURN:CLEAR MONITORS
235 PRINT:PRINT:PRINT"Press Fire
 Button to continue..."
240 IFBUTTON(BU)THENHSCREEN2:RET
URNELSE240
245 WIDTH40:ATTR0,0:CLS:PRINT:PR
INT:RETURN:'PREPARE TEXT SCREEN
250 V(6)=1:GOSUB205:HPRINT(1,18)
,"NO POWER FOR THE GUN!":RETURN
255 OX=7+A*44:OY=186:HCOLOR13,0:
HLINE(OX,OY)-(OX+25,167),PSET,BF
:GOSUB185:RETURN:PREPARE FOR CAR
GO
260 HPRINT(1,17),"SCORE="+STR$(V
(7))+"  ASSETS= $"+MID$(STR$(V(8
)),2):RETURN
265 FORK=1TO15:GOSUB160:NEXT:GOS
UB170:RETURN
270 GOSUB285:GOSUB235:HSCREEN2:P
OKE65496,0:FORK=30TO0STEP-5:PLAY
"L255O1;V=K;1;2;3;6;4;8;9;11;3;2
;12;3;2;1;V15;O3":NEXT:IFO=6GOSU
B210:HPRINT(7,2),"COCO LIVES FOR
EVER!"
275 EXECF2:HCOLOR4,0:HPRINT(1,15
),"Play again (Y/N)?":GOSUB260
280 Q$=INKEY$:IFQ$="N"THENWIDTH4
0:CLS:PRINT"BYE! BYE!":ENDELSEIF
Q$="Y"THEN10 ELSE280
285 POKE&HE6,2:POKEP1,221:POKEP2
,221:EXECF1:HDRAW"BM30,40":A=F1+
652:FORX=1TO2:A$="":FORK=1TO197:
A$=A$+CHR$(PEEK(A)):A=A+1:NEXT:H
DRAWA$:NEXT:HDRAW"S4":RETURN
290 FORK=1TO15:GOSUB160:NEXT:GOS
UB245:FORK=F1+1265TOF1+1534:PRIN
TCHR$(PEEK(K));:NEXT:PRINT:PRINT
"You have been given a lifetime
subscrip-tion to The RAINBOW and
 even your own  column!":GOTO27
0
295 HBUFF1,15:FORK=2TO19:HBUFFK,
400:NEXT:RETURN:'SET BUFFERS
300 CD=0:IFV(5)=0ORD=1OR(8ANDA(R
))<>8THEN115ELSEPR=R:R=R-20:GOTO
320
305 CD=0:IFV(5)=0ORD=1OR(1ANDA(R
))<>1THEN115ELSEPR=R:R=R-1:GOTO3
25
310 CD=0:IFV(5)=0ORD=1OR(2ANDA(R
))<>2THEN115ELSEPR=R:R=R+1:GOTO3
20
315 CD=0:IFV(5)=0ORD=1OR(4ANDA(R
))<>4THEN115ELSEPR=R:R=R+20:GOTO
325
320 V(7)=V(7)+1:A(R)=(A(R)OR64):
GOSUB200:IFR(PR)=R(R)GOSUB190:EX
ECM2:GOSUB170:IFR(R)=32THEN25ELS
E40ELSEGOSUB170:GOTO25
325 V(7)=V(7)+1:A(R)=(A(R)OR64):
GOSUB200:IFR(PR)=R(R)GOSUB190:EX
ECM1:GOSUB170:IFR(R)=32THEN25ELS
E40ELSEGOSUB170:GOTO25
330 POKEP1,0:POKEP2,0:EXECF1:HDR
AW"BM8,39C14R239":HPAINT(10,10),
12,14:S=6:R$="UNDER ATTACK!":GOS
UB215:IFO(1) THENA$="NO GUN?!"EL
SEA$="Guns Engaged!"
335 HPRINT(1,17),A$:FORY=40TO95S
TEP6:HDRAW"XCL$;BM8,=Y;C9R239BD2
C10L239BD2C11R239":NEXT:C=9:X=20
:H=RND(218):HGET(H,39)-(H+22,31)
,4:H=H+8:HDRAW"BM=H;,39XFS$;":H=
H-8
340 FORK=9TO11:PALETTEK,0:PALETT
EC,18:C=K:HPUT(H,39)-(H+22,31),4
,PSET:HDRAW"BM=X;,102C14RDL":IFS
<1THENK=12:NEXT:GOSUB160:RETURNE
LSEH=RND(16)-8+H:IFH>225THENH=10
ELSEIFH<10THENH=220
345 IFV(6)<1GOSUB265:GOSUB160:NE
XT:GOSUB245:PRINT"Your shields h
ave failed and your craft destro
yed.. And so were you!":GOTO270E
LSEHGET(H,39)-(H+22,31),4:H=H+8:
HDRAW"BM=H;,39XFS$;":H=H-8:IFRND
(10)=1THENA=1:B=H+12:GOSUB360:GO
SUB205
350 IFO(1)THENNEXT:GOTO340ELSEIF
BUTTON(BU)=0THENY=JOYSTK(0):X=JO
YSTK(JH)*3.5+16:HDRAW"BM=X;,102C
7RDL":NEXT:GOTO340
355 V=HPOINT(X,39):A=3:B=X:GOSUB
360:GOSUB205:IFV=13THENS=S-1:HPU
T(H,39)-(H+22,31),4,NOT:PLAY"ADG
FBCEDEFGAGC":HPUT(H,39)-(H+22,31
),4,PSET:H=RND(218):GOTO345ELSEN
EXT:GOTO340
360 HGET(B,100)-(B+1,39),3:HDRAW
"BM=B;,100C=A;U61RD61":PLAY"L255
GEDCB":HPUT(B,100)-(B+1,39),3,PS
ET:RETURN
365 POKEP1,136:POKEP2,136:EXECF1
:HCOLOR9,0:HLINE(64,38)-(192,48)
,PSET,BF:HCOLOR10,0:HLINE(24,54)
-(120,64),PSET,BF:HCOLOR11,0:HLI
NE(136,54)-(232,64),PSET,BF
370 HCOLOR4,0:HPRINT(9,5),"SAUCE
R ATTACK!":HPRINT(4,7),"ONLY $1.
00":HPRINT(18,7),"ONLY $1.00":FO
RX=15TO225STEP38:Y=X+19:HDRAW"BM
=X;,17XFS$;BM=Y;,28XFS$;":NEXT:S
=12:RETURN
```

```
375 GOSUB215:HPRINT(1,16),"Guns
Engaged!":HPRINT(1,17),"Press an
y key to disengage."
380 IFM THENEXECM3
385 IFBUTTON(BU)=0THENY=JOYSTK(0
):HDRAW"BM=X;,102C14RDLC4":IFS<1
ORINKEY$<>""THENRETURNELSEX=JOYS
TK(JH)*3.25+24:HDRAW"BM=X;,102C7
RDL":GOTO380
390 V(6)=V(6)-2:IFV(6)<3GOSUB250
:GOTO380ELSEGOSUB205
395 V=HPOINT(X,28):IFV=13THENY=2
8ELSEV=HPOINT(X,17):Y=17
400 HGET(X,100)-(X+1,Y),3:HDRAW"
BM=X;,100C3M=X;,=Y;C8":PLAY"L255
GEDCBA":HPUT(X,100)-(X+1,Y),3,PS
ET:IFV=13ANDR=147THENHLINE(X-14,
Y)-(X+14,Y-8),PSET,BF:PLAY"ABEF"
:S=S-1:GOTO380ELSE380
405 CD=0:GOSUB215:A$="Nothing sp
ecial":IFR=1THENA$="This door is
 locked!"ELSEIFR(R)=29THENA$="Ve
ry clean!"ELSEIFR(R)=30THENA$="V
ery noisy!"ELSEIFR(R)=23ORR(R)=2
7THENA$="It's hot out here"ELSEI
FR(R)=25THENA$="Flying Saucers!"
410 IFR(R)=26THENA$="A lump on t
he ground"ELSEIFR(R)=19THENA$="W
ho would bury computers"ELSEIFR(
R)=18THENA$="Graffiti on the wal
ls"ELSEIFR=147THENA$="Practice w
ould help you"ELSEIFR(R)=16THENA
$="A shooting gallery ahead"
415 IFR(R)=15THENA$="I hear dogs
 barking!"ELSEIFR(R)=14THENA$="L
ooks inviting"ELSEIFR(R)=33ORR(R
)=34THENA$="A lump in the sand"E
LSEIFR(R)=12THENA$="The fish are
 frightened"ELSEIFR(R)=11THENA$=
"Hole"+STR$(RND(18))ELSEIFR(R)=2
THENA$="Looks deserted."
420 IFR=59THENA$="Bullet-proof w
indows"ELSEIFR=19ORR=39THENA$="D
oor is locked"ELSEIFR(R)=3THENA$
="Door is open"ELSEIFR=48THENA$=
"Something smells good!"ELSEIFR(
R)=1THENA$="Dark and dingy"ELSEI
FR=126ORR=85THENA$="Identificati
on required!"
425 IFR(R)=13THENA$="Looks hungr
y!"ELSEIFR=20THENA$="It's your k
ind of place"ELSEIFR=40THENA$="E
veryone has moved out"ELSEIFR=60
THENA$="Lotsa guns!"
430 IFD THENA$="SPOOKY!"
435 HPRINT(1,17),A$:GOTO115
440 CD=0:L=1AND(L+1):C=13-L:HDRA
W"BM314,4C=C;RDLU":GOSUB215:HPRI
```

SUNDOG SYSTEMS

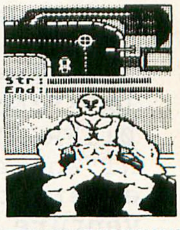
Kung-Fu Dude

SCORE 550
TIME 133
STRENGTH

An exciting new arcade game by Glen Dahlgren. This is the long-awaited response to the huge demand for a Kung-Fu program for the Coco. The graphics and sound effects are spectacular. The action and animation will please even the most die-hard arcade enthusiast. Destroy your opponents and evade obstacles with over ten different moves as you grow ever closer to your ultimate objective. This is the BEST karate game ever available for the color computer. Req. 64K, disk drive, and joystick. Introductory price: only $24.95.

WHITE FIRE OF ETERNITY. Enter the age of monsters, magic, and adventure. Here you will search for the legendary power of White Fire throughout the Forbidden Wood and dark caverns of the Mount. The Rainbow review of 12/86 says, "Visually, White Fire is quite an achievement. The graphics are excellent!" Discover what adventuring on the Coco is all about. Req. 64K and disk drive. Only $19.95.

CHAMPION. Become a superhero in your fight to rid the world of the evil forces of Mr. Bigg in this action adventure. The combat is hot and heavy and requires a fast joystick. The graphics and sound effects are sensational. "This is a fascinating game and a difficult one to master. You'll get a blast out of (Champion)!" says the Rainbow review of 5/87. Defend the innocent and defeat the villainous; be a true Champion! Req. 64K, disk drive, and joystick. Only $19.95.



All programs Coco 1, 2, 3 compatible.

Sundog systems

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```
NT(1,17),"Lights "+MID$("ON OFF"
,(C-12)*3+1,3):IF(A(R)AND32)=0AN
DLO=0THEN115ELSELO=0:GOTO25
445 CD=0:X=10:Y=X:IFBUTTON(BU)TH
EN445ELSEGOSUB215:HPRINT(1,17),"
Receive Cargo"
450 IFM THENEXECM3
455 IFBUTTON(BU)=0THENHGET(X,Y)-
(X+4,Y+4),1:HPUT(X,Y)-(X+4,Y+4),
1,PRESET:HPUT(X,Y)-(X+4,Y+4),1,P
SET:X=JOYSTK(0):X=JOYSTK(JH)*3.7
+8:Y=JOYSTK(JV)*1.4+10:GOTO450
460 A=5:FORK=0TO4:IFV(K)=-1THENA
=K:NEXTELSENEXT
465 O=INT((X-8)/26)+INT(Y/81)*9:
OG=O:IFO=15THENFORK=15TO22:IFO(K
)=R THENO=K:NEXTELSENEXT ELSEIFO
=16THENFORK=23TO29:IFO(K)=R THEN
O=K:NEXTELSENEXT ELSEIFO=17THENF
ORK=30TO35:IFO(K)=R THENO=K:NEXT
ELSENEXT
470 IFY<56ORO(O)<>R GOSUB225:GOT
O115 ELSEIFO<30ANDA=5THENA$="Hol
ding Tanks Full":GOTO480
475 HP=1:GOSUB175:IFO=6GOTO290EL
SEA$="Cargo Secured":IFO<30THENO
X=7+A*44:OY=186:HCOLOR13,0:HLINE
(OX,OY)-(OX+25,167),PSET,BF:HP=0
:GOSUB185:V(A)=O:O(O)=0 ELSEO(O)
=0:V(8)=V(8)+350000:GOTO25
480 GOSUB215:HPRINT(1,17),A$:GOT
O115
485 IFBUTTON(BU)THEN485ELSEGOSUB
220:GOSUB125:IFA=5GOSUB225:GOTO1
45ELSEIFV(A)=-1THEN485ELSEGOSUB2
30:O=V(A):V(A)=-1:O(O)=R:GOSUB17
5:GOSUB215:HPRINT(1,17),O$(O)+"
Released":GOTO145
490 IFBUTTON(BU)THEN490ELSEGOSUB
220:GOSUB125:IFA=5GOSUB225:GOTO1
45ELSEIFV(A)=-1THEN490ELSEGOSUB2
15
495 A$=" ":CD=0:ONV(A)+1GOTO500,
505,510,510,525,525,0,530,540,55
5,570,575,585,600,605:GOTO610
500 GOSUB265:GOSUB245:PRINT"The
food was spoiled and Botulism ha
s   ended your adventure.":GOTO2
70
505 IFR=147THENA$="NO PAY - NO P
LAY!":GOTO615ELSES=1:GOSUB375:S=
0:IFR(R)=13GOSUB265:GOSUB245:PRI
NT"While your aim was true, ther
e were too many of them. Your ad
venture is over.":GOTO270ELSEA$=
"That was fun!":GOTO615
510 IFR=19ORR=39ORR=49ORR=28ORR=
85ORR=25THENA(R)=(A(R)OR128):W=1
:GOSUB150ELSEIFV(A)=3THENA$="You
 "+MID$("SlicedHooked",RND(2)*6-
5,6):GOTO615ELSEA$="Whew, what a
 swing!":GOTO615
515 IFR=19ORR=39THENA(R)=(A(R)OR
2):GOTO615ELSEIFR=25THENA(R)=(A(
R)OR11):GOTO615
520 IFR=85GOSUB265:GOSUB245:PRIN
T"The building was shielded from
 the Con- trollers influence. Yo
u have compromisedthe shield and
 for you this adventure isover!"
:GOTO270
525 O(V(A))=0:GOSUB245:PRINT"Tha
t was delicious... But there is
some-thing hard in it!":PRINT"It
's a gold nugget worth $500!":GO
SUB235:GOSUB230:O(V(A))=0:V(A)=-
1:V(8)=V(8)+500:GOTO615
530 IFR(R)=13THENR(R)=34:A(R)=(A
(R)OR31):GOSUB245:PRINT"You inju
red the shark causing him to
bleed, which attracted other sha
rks who devoured the attacking s
hark while you  escaped!":GOSUB2
35:GOSUB770:W=1:GOTO145
535 A$="A dentist is needed":GOT
O615
540 IFR(R)<>15THENA$="Where's th
e wire?!":GOTO615
545 HPRINT(36,19),"S":GOSUB150:I
FO(0)=R OR V(9)=1THENO(0)=0:V(9)
=1:A(R)=(A(R)OR132):A(R+20)=(A(R
+20)OR8):GOSUB245:PRINT"Guard do
gs went for the food, letting
you pass.":GOSUB235:HP=1:O=0:GOS
UB175:GOTO615
550 GOSUB265:GOSUB245:PRINT"Pit
Bull guard dogs attacked and hav
e  ended your adventure!":GOTO2
70
555 IFR(R)=34THENR(R)=12ELSEIFR(
R)=33THENR(R)=14ELSEIFR(R)=26THE
NR(R)=20ELSEIFR(R)=19THENA$="HER
E?! Are you nuts?!":GOTO615ELSEA
$="Don't break your shovel!":GOT
O615
560 FORK=28TO33:IFO(K)=0THENO=K:
NEXTELSENEXT
565 O(O)=R:GOSUB175:A$="Buried t
reasure = $350,000!":GOTO615
570 IFR<>59THENA$="It doesn't wo
rk":GOTO615ELSEA(R)=(A(R)OR2):A$
="It worked! You may pass.":HPRI
NT(38,17),"E":GOTO615
575 IFR=126THENA(R)=(A(R)OR136):
HPRINT(36,15),"N":HCOLOR11,0:HLI
NE(83,38)-(151,80),PSET,BF:A$="T
he gate opens":GOTO615ELSEIFR=85
GOSUB245:PRINT"A MESSAGE APPEARS
 ON THE WALL MONITOR...":FORK=F1
+1046TOF1+1264:PRINTCHR$(PEEK(K)
);:NEXT:GOSUB235:GOTO615
580 A$="Nobody wants to see it":
```

```
GOTO615
585 IFR<>147THENA$="I'd hang on
to that dollar":GOTO615ELSEIFO(1
) THENA$="NO GUN- NO PLAY!":GOTO
615
590 GOSUB230:O(12)=126+RND(5):V(
A)=-1:GOSUB375
595 GOSUB160:IFS<1THENA$="Anothe
r passage is revealed!":A(R)=(A(
R)OR2):HPRINT(38,17),"E":GOTO615
ELSEGOSUB225:GOTO145
600 IFR<>1THENA$="It has no effe
ct":GOTO615ELSEA$="It works! The
 door is open!":A(R)=(A(R)OR4):H
PRINT(36,19),"S":GOTO615
605 GOSUB245:PRINT"THE LETTER IS
 SMUDGED! IT SAYS...":PRINT:PRIN
T"   I have be n captur d by t e
 Control- lers. I have learn d t
hat they are only m c  n s. Disc
o ec  the p w r to defe tthem!"
TAB(60)"M. Goodman...":GOSUB235:
GOTO615
610 IFV(A)<23THENA$="Fuel tank r
e-filled":V(A)=-1:V(5)=48:GOSUB2
30:GOSUB200ELSEA$="Battery re-ch
arged":V(A)=-1:V(6)=48:GOSUB230:
GOSUB205
615 GOSUB215:HPRINT(1,17),A$:GOT
0145
620 IFBUTTON(BU)THEN620ELSE:GOSU
B220:GOSUB125:IFA=5GOSUB225:GOTO
145ELSEIFV(A)=-1THEN620ELSEGOSUB
215:HPRINT(1,17),"Tank"+STR$(A+1
)+": "+O$(V(A)):IFV(A)=11THEN109
0ELSE145
625 CD=0:GOSUB215:HPRINT(1,17),"
SCORE="+STR$(V(7))+"  ASSETS= $"
+MID$(STR$(V(8)),2):GOTO115
630 WIDTH40:CLS5:ATTR0,4:PRINTTA
B(13)"* TRAVEL MAP *":PRINT:ATTR
0,0:FORK=1TO200:IFK=R THENATTR0,
0,B ELSEATTR0,0
635 IF(A(K)AND64)=64THENPRINTHEX
$((A(K)AND15))" ";ELSEPRINT"  ";
640 NEXT:ATTR0,4:PRINT:FORK=1TO1
5:A=K*5:PRINTHEX$(K)"=";:FORC=0T
O3:IF(K ANDD(C))=D(C)THENPRINTMI
D$("NSEW",C+1,1);ELSEPRINT".";
645 NEXT:PRINT"  ";:NEXT
650 IFBUTTON(BU)THEN670ELSEX=JOY
STK(0):X=(JOYSTK(JH)/1.6)AND254:
Y=INT(JOYSTK(JV)/6.4):MR=X/2+Y*2
0+1:LOCATEX,Y+2:IFMR=R THENATTR0
,0,B ELSEATTR0,0
655 IFXJ=X ANDYJ=Y THEN650ELSEXJ
=X:YJ=Y:LOCATE0,17:ATTR0,4:PRINT
STRING$(200,32):LOCATE0,17:IF(A(
```

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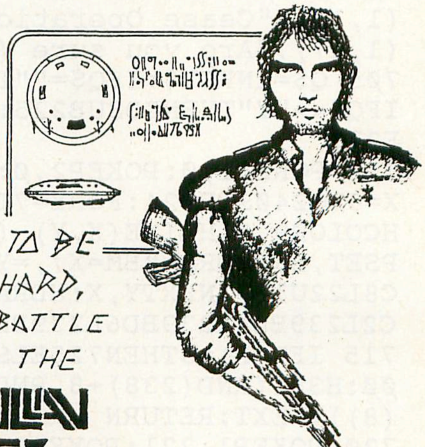

IT WAS TO BE
A LONG, HARD,
LOSING BATTLE
UNTIL... THE

CURRILLIAN
CRUISER

JOIN THE CURRILLIAN
CRUISER, AT THE
YEAR 2584, IN ITS
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```
MR)AND64)=64THENPRINTR$(R(MR))EL
SE650
660 FORK=0TO35:IFO(K)=MR THENPRI
NTO$(K)", ";:NEXTELSENEXT
665 GOTO650
670 CD=0:ATTR0,0:HSCREEN2:GOTO11
5
675 CD=0:POKE65496,0:GOSUB245:IN
PUT"sAVE/lOAD";A$:INPUT"dISK/tAP
E/aBORT";Q$:IFQ$="D"THENDN=1ELSE
IFQ$="T"THENDN=-1ELSEHSCREEN2:GO
TO115
680 PRINT:INPUT"Prepare device &
 press ENTER";Q$:PRINT:IFA$="S"T
HENPRINT"SAVING":OPEN"O",DN,"C":
PRINT#DN,R:FORK=0TO9:PRINT#DN,V(
K);:NEXT:FORK=0TO35:PRINT#DN,O(K
);:NEXT:FORK=1TO200:PRINT#DN,R(K
);A(K);:NEXT:CLOSE:HSCREEN2:GOTO
115
685 IFA$="L"THENPRINT"LOADING":O
PEN"I",DN,"C":INPUT#DN,R:FORK=0T
O9:INPUT#DN,V(K):NEXT:FORK=0TO35
:INPUT#DN,O(K):NEXT:FORK=1TO200:
INPUT#DN,R(K),A(K):NEXT:CLOSE:HS
CREEN2 ELSE675
690 FORA=0TO4:IFV(A)=-1GOSUB230E
LSEOG=V(A):IFOG>22THENOG=16:GOSU
B255ELSEIFOG>14THENOG=15:GOSUB25
5ELSEGOSUB255
695 NEXT:PR=0:GOTO20
700 CD=0:EXECF2:HCOLOR4,0:HPRINT
(1,15),"Cease Operations":HPRINT
(1,17),"Are you sure (Y/N)?"
705 Q$=INKEY$:IFQ$=""THEN705ELSE
IFQ$<>"Y"THENGOSUB225:GOTO115ELS
E275
710 POKEP1,0:POKEP2,0:EXECF1:FOR
X=8TO240STEP24:FORY=7TO67STEP11:
HCOLOR9,8:HLINE(X,Y)-(X+22,Y+9),
PSET,BF:HDRAW"BM=X;,=Y;C13R22D10
C8L22U10":NEXTY,X:HDRAW"BF10BR13
C2L239BD4R239BD6L239BD8R239"
715 IFR(R)=3THEN725ELSEFORK=1TO1
00:HSET(RND(238)+8,RND(82)+8,RND
(8)):NEXT:RETURN
720 POKEP1,221:POKEP2,136:EXECF1
725 HCOLOR14,8:HLINE(18,14)-(78,
56),PSET,BF:HLINE(238,14)-(178,5
6),PSET,BF:GOSUB155:IFR=39THENA$
="LOCK":B$="SMITHS"ELSEIFR=59THE
NA$="GUNS":B$="&AMMO"ELSE735
730 HDRAW"BM24,40C3R48BR112R48C4
":HCOLOR4,0:FORK=0TO20STEP20:HPR
INT(4+K,3),A$:HPRINT(3+K,4),B$:N
EXT:GOTO745
735 FORK=38TO198STEP160:FORX=K T
OK+40STEP20:FORY=14TO42STEP14:HD
RAW"BM=X;,=Y;C9L19D13C12R19U13":
NEXTY,X,K:IFR=19THENFORY=35TO195
STEP160:FORX=0TO26STEP26:FORK=0T
O2:HCIRCLE(Y+K+X,54),15,1,2.5,.5
,1:NEXTK,X,Y
740 IFR(R)=3THENFORX=20TO180STEP
160:HDRAW"BM=X;,46C3R56H10U10L36
D10G10":HPAINT(X+9,44),3,3:NEXT:
RETURN
745 FORX=78TO238STEP160:HDRAW"BM
=X;,14C8D42L63C4U42R63":NEXT
750 HCOLOR13,8:HLINE(8,72)-(247,
90),PSET,BF:HDRAW"BM8,91C8E20R30
G20R30E20R30G20R30E20R30G20R30E2
0R30G20":HCOLOR14,8:HLINE(8,90)-
(247,94),PSET,BF:HPAINT(9,98),8,
14:RETURN
755 POKEP1,85:POKEP2,85:EXECF1:H
DRAW"BM8,44C14E10F10E13F13E8F8E1
0F10E9F9E15F15E5F5E15F15E15F15E1
4F14E5F8D12H10G10H13G13H8G8H10G1
0H9G9H15G15H5G5H15G15H15G15H14G1
4H5G10D5R79FR79E2R81":HPAINT(10,
10),12,14:HPAINT(10,54),15,14:HP
AINT(10,62),0,14
760 HCIRCLE(51,90),30,15,.3:HPAI
NT(50,90),15,15:HCIRCLE(50,90),3
,9,.5:HDRAW"BM50,90C8U40M+10,+5M
-9,+5D31C14M+22,-6R4M+20,-5D6M-8
,-3":HPAINT(53,55),3,8:HPAINT(94
,82),14,14:C=14:FORX=42TO50:HCIR
CLE(X,90),30,C,.3,.4,.7:IFX=45TH
ENC=4:NEXTELSENEXT
765 HDRAWCL$:FORK=1TO50:HSET(RND
(239)+8,RND(30)+70,15):NEXT:RETU
RN
770 POKEP1,34:POKEP2,34:EXECF1:H
DRAW"BM8,60C14R80ER80FR78":HPAIN
T(10,64),10,14:FORK=1TO100:HSET(
RND(235)+10,RND(40)+60,RND(2)*4)
:NEXT
775 FORK=1TO8:X=RND(20)*10+20:Y=
RND(4)*4+8:C=RND(5)+2:FORA=1TO9:
HCIRCLE(X,Y),A,C,.4:NEXT:X=X-8:H
DRAW"BM=X;,=Y;C=C;H4D8E4LH3D6E3L
H2D4E2LBR16BUC8R":NEXT
780 IFR(R)=34THENFORK=0TO8:HCIRC
LE(228,90),K,9,.4:NEXT
785 RETURN
790 POKEP1,68:POKEP2,68:EXECF1:H
DRAW"BM8,60C14R20M+30,+4R50M+20,
-2R80M+40,-2U10L240":HPAINT(10,1
0),12,14:HPAINT(10,55),2,14:HDRA
W"BM20,35C4R4F2E2R2BR20BUR4F2E2R
4BR30BD2R4F2E4R4 XCL$;"
795 IFR(R)=33THENFORK=0TO8:HCIRC
LE(228,90),K,13,.4:NEXT
800 RETURN
805 POKEP1,136:POKEP2,136:EXECF1
:HDRAW"BM8,60C14R240D18L240DR240
DL240":HPAINT(10,70),13,14:FORX=
9TO247STEP4:HDRAW"BM=X;,81C3D20"
:NEXT:HDRAW"BM72,12C2R113D20L113
U20HR115D22L115U22BH3BL2C4R125D2
```

```
9L125U29":HPAINT(78,20),4,2
810 FORX=80TO82:HDRAW"BM=X;,26C1
U5E4F4ND5E4F4D5":NEXT:HDRAW"BM76
,14C3R26D16L26U16BR34BD2C8R40BD4
L40BD4R40BD4L40BR50R20BU4L20BU4R
20BU4L20":Y=46:FORC=15TO0STEP-15
:FORY=Y TOY+6STEP2:HDRAW"BM8,=Y;
C=C;R239":NEXTY,C
815 HDRAW"BM8,52C14R20NU44E6U38L
26BR46D44R160NU44E6U38L28D30L127
U30L10BM8,20R16D20L16C12BER14BU2
L14BU4R14BU2L14BU4R14BU2L14BM60,
20C14NR4D20NE4R146U4NL14U16L14
820 HPAINT(10,9),13,14:HPAINT(10
0,50),13,14:HPAINT(30,10),14,14:
HPAINT(218,10),14,14:HPAINT(200,
38),12,14:HDRAW"BM9,44C4R12BD2L1
2BD2R12BUC8L12BU2R12BU2L12BM8,10
C4R18C8D2L18BR48R8BU2C4L8NDBR138
R18C8D2L18"
825 FORX=72TO156STEP42:HDRAW"BM=
X;,44C4R36BD2L36BD2R36BUC8L38BU2
R36BU2L36":NEXT:RETURN
830 POKEP1,221:POKEP2,221:EXECF1
:FORY=17TO43STEP2:HDRAW"BM8,=Y;C
15R239":NEXT:FORY=45TO101STEP2:H
DRAW"BM8,=Y;C0R239":NEXT:HDRAW"B
M247,37C14M-10,-20U9LD9L228D24R1
00E8R20G20L109D15R109NU15E20U15D
4R112D4L112D4R112D4L112"
835 HPAINT(10,10),3,14:HPAINT(10
,42),4,14:HPAINT(10,62),12,14:HP
AINT(119,60),2,14:HPAINT(200,39)
,8,14:HPAINT(200,47),8,14:FORX=0
TO40:HCIRCLE(200,70),X,RND(8),.3
:NEXT:RETURN
840 POKEP1,221:POKEP2,221:EXECF1
:FORY=50TO60STEP2:HDRAW"BM8,=Y;C
2R239":NEXT:FORY=62TO100STEP2:HD
RAW"BM8,=Y;C12R239":NEXT:HDRAW"B
M48,7C14D53R148NU53E10U44L20D49L
56NU49BM+10,-6NR46U43L26D49L56NU
49BM+10,-6NR46U43"
845 FORX=64TO204STEP70:HPAINT(X,
20),14,14:NEXT:HPAINT(54,20),10,
14:HDRAW"BM59,55C8M+10,-6BR72M-1
0,+6"
850 G$="C8U3LD3LU3LD3LU6ED4RU6ED
7RU16G2F2U8RD14EU22ED20EU30LD10"
:FORK=74TO106STEP8:X=K+72:HDRAW"
BM=K;,52XG$;BM=X;,52XG$;":NEXT:F
ORX=8TO46STEP4:HDRAW"BM=X;,7C6D4
3BR200U43":NEXT:RETURN
855 POKEP1,221:POKEP2,221:EXECF1
:FORY=60TO100STEP2:HDRAW"BM8,=Y;
C9R239C14":NEXT:C=8:B=248:FORK=8
TO300STEP8:Y=K:X=K:H=256-K:IFY>6
0THENY=60:IFX>248THENX=248:H=8:C
=C+8:B=B-8
860 HLINE(X,C)-(X-Y+C,Y),PSET:HL
INE(H,C)-(B-X+Y,Y),PSET:NEXT:FOR
X=18TO247STEP80:HDRAW"BM=X;,7C8D
55L3BUC4U54RD54":NEXT:RETURN
865 POKEP1,0:POKEP2,0:EXECF1:HDR
AW"BM8,80C14R240U30L240":HPAINT(
10,10),12,14:HPAINT(10,70),13,14
:HDRAW"BM108,66C3U20R60D20L5H4L7
G4L20H4L7G4L5BU7BR10R40U10L40D10
BR5BUC8U8BR8D8BR8U8BR8D8BR8U8":H
PAINT(110,64),3,3:FORY=3TO5:HCIR
CLE(120,68),Y,8
870 NEXT:HCOLOR13,0:HLINE(138,10
0)-(238,80),PSET,BF:FORX=138TO23
8STEP4:HDRAW"BM=X;,100C6U20C0":N
EXT:HLINE(173,100)-(203,97),PSET
,BF:HDRAW"XCL$;BM138,100C8U20E50
M-30,+52NM-20,-2M+30,+2NU54M+35,
-2NM-35,-52M+15,-2NH50D20L35U3NL
27U9L30D12NE3L35"
875 C=0:FORX=145TO240STEP30:C=C+
1:HPAINT(X,78),C,8:NEXT:HDRAW"BM
60,63C8M-15,+38R30M-15,-38":HPAI
NT(60,65),8,8:HPAINT(178,95),8,8
:C=0:FORY=0TO8:C=C+1:HCIRCLE(60,
63),27+Y,C:HCIRCLE(60,63),Y,C:NE
XT:HDRAW"BM60,63C4U32RD64LU32L32
DR64UL32E22FG44HE22F22GH44EF"
880 RETURN
885 POKEP1,238:POKEP2,238:EXECF1
:FORK=1TO50:X=RND(200)+8:Y=RND(5
2)+7:H=RND(30):V=RND(20):C=RND(7
):HDRAW"BM=X;,=Y;C=C;M+=H;,+=V;"
:NEXT:GOSUB210
890 C=0:FORX=224TO236STEP2:C=C+1
:FORY=10TO70STEP10:HDRAW"BM=X;,=
Y;C=C;F5G5":NEXTY,X:FORC=1TO7:HC
OLORC,0:HPRINT(1+C,C),MID$("RAIN
BOW",C,1):NEXT:HDRAW"BM8,80C8R23
9D21L239U21BUC13R78U72RC8D72C13R
79U72RC8D72C13R79U72RC8D72":HPAI
NT(10,90),8,8:RETURN
895 POKEP1,238:POKEP2,238:EXECF1
:FORY=40TO100STEP2:HDRAW"BM8,=Y;
C15R239":NEXT:HDRAW"XCL$;BM8,32C
8R239BD4L239":FORX=8TO247STEP10:
HDRAW"BM=X;,29D11":NEXT
900 HDRAW"BM30,65C13R10U15R10U10
L10U10L10D10L10D10R10D15BM77,79U
40E6R20F6D40L32BM150,71U5R10NM+4
,+2U33E4ND39F4D33R10D5L28BM204,5
9U30R25D30L25"
905 HPAINT(32,63),13,13:HPAINT(7
9,77),13,13:HPAINT(152,69),13,13
:HPAINT(162,62),4,13:HPAINT(206,
58),13,13
910 HDRAW"BM30,65C8R10U15R10U10B
L10U10BG10BD10L10BM109,79U40H6BM
178,71U5BL10NM-4,+2BU33M-4,+2C13
M-4,-2C8BM230,59U30"
915 Y=65:X=35:GOSUB920:Y=79:X=93
:GOSUB920:Y=75:X=164:GOSUB920:Y=
59:X=217:GOSUB920:HPRINT(10,6),"
```

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IBM":HDRAW"BM220,44C3L6HR8EL10UR
10UL10ER8HL6R2FC8E3":RETURN
920 C=14:FORY=Y TOY+20:HCIRCLE(X
,Y),25,C,.2,.5,1:C=15:NEXT:HDRAW
"BM=X;,=Y;C14NL25R25BH2L46":RETU
RN
925 POKEP1,204:POKEP2,204:EXECF1
:HDRAW"BM8,32C13R239BD4L239BD2C1
4R239C13":HPAINT(10,98),0,14:FOR
X=8TO247STEP10:HDRAW"BM=X;,29D11
":NEXT:FORK=1TO100:HSET(RND(238)
+8,RND(61)+37,14):NEXT
930 H=0:FORK=1TO7:X=RND(10)*20+1
0:Y=RND(10)+50:H=1AND(H+1):C=H+8
::HDRAW"BM=X;,=Y;C=C;U8NF4HL13DR
14DL14DR14DL2ND4L12D4BR2BDU9L6UR
10HL8ER5BL2HL7HBR18GL10":NEXT
935 IFR(R)=25THENFORK=15TO225STE
P35:X=K+RND(4):Y=RND(13)+13:HDRA
W"BM=X;,=Y;XFS$;":NEXTELSEHDRAWC
L$:IFR(R)=26THENFORK=0TO8:HCIRCL
E(228,90),K,15,.4:NEXT
940 RETURN
945 POKEP1,204:POKEP2,204:EXECF1
::HDRAW"XCL$;BM8,78C5R239BDL239B
DC14R100U40R30U10R20NF4D10R4NU6R
26F4D36L4NU40L80R139":HPAINT(120
,70),4,14:HPAINT(10,100),13,14
950 HPAINT(160,35),14,14:HPAINT(
190,45),14,14:FORX=114TO178STEP8
:FORY=44TO70STEP4:HLINE(X,Y)-(X+
4,Y+2),PSET,BF:NEXTY,X:HLINE(138
,74)-(154,80),PSET,BF:HDRAW"BM13
8,80C13U6R8ND6R8D6C0R34GL31BL20L
27HR30C2BM143,39U7RD7RU7D3R4DNL4
D3U7RD7RU7C14":RETURN
955 POKEP1,0:POKEP2,0:EXECF1:HDR
AW"BM8,102C14U2E10U10R120D10F12R
98U22L110U66L120D66NL10D4":HPAIN
T(10,10),4,14:HPAINT(30,50),14,1
4:HPAINT(20,100),13,14:HDRAW"BM1
9,80C13U66R59ND66R59C8D66L120C13
U67R122C8D68L122"
960 HDRAW"BM68,45C13D10RU10RD10R
U10RD10RU10BR10D10RU10RD10RU10RD
10RU10":FORX=154TO240STEP8:FORY=
84TO96STEP6:C=RND(7):HDRAW"BM=X;
,=Y;C=C;EFGHC2":NEXTY,X
965 IFR=25THENHPRINT(19,4),"WEST
 POINT":HPRINT(20,5),"HOSPITAL"E
LSEHPRINT(21,4),"FALSOFT":HPRINT
(22,5),"-WEST":HDRAW"BM198,54C8D
10L10U10R10C13EL12D12GU14R14C14D
14L14ER12U12":HPAINT(190,58),2,8
970 RETURN
975 POKEP1,187:POKEP2,187:EXECF1
:HDRAW"XCL$;BM8,80C14R239U16C4L2
39BU16R239":HPAINT(10,100),13,14
:FORX=8TO247STEP24:HDRAW"BM=X;,8
0C4U40EC8FD40C11":NEXT
980 IFR=126THENGOSUB150:IF(A(R)A
ND128)<>128THENHDRAW"BM83,79C4U3
2R68D16L68DR68M-68,+15R68NU16M-6
8,-15":HPRINT(11,7),"FALSOFT"
985 RETURN
990 POKEP1,187:POKEP2,187:EXECF1
:HDRAW"XCL$;BM8,78C5R239BDL239BD
C14R80U40NR132L2E10R114NM+18,+12
F10L2D40L60U10L20D10L60R148NU38R
22"
995 HPAINT(10,100),13,14:HPAINT(
100,70),4,14:HPAINT(100,35),9,14
:HPAINT(220,70),14,14:HPAINT(155
,78),14,14:FORX=93TO213STEP16:FO
RY=44TO66STEP6:HLINE(X,Y)-(X+8,Y
+3),PSET,BF:NEXTY,X:HDRAW"BM138,
80C13U10R10ND10R10D10L20C0L50FR4
6BR26R56EL60C2BU5BR2R4GL"
1000 RETURN
1005 POKEP1,68:POKEP2,204:EXECF1
:HDRAW"BM8,71C14R239UL239UR239UL
239UR239UL239":HPAINT(10,100),4,
14
1010 FORX=8TO247STEP30:HDRAW"BM=
X;,101C14E30":NEXT:HDRAW"BM8,91R
239BU10L239":FORX=36TO247STEP60:
FORY=76TO96STEP20:HPAINT(X,Y),12
,14:NEXTY,X:FORX=8TO247STEP58:HP
AINT(X,86),12,14:NEXT:GOSUB155:R
ETURN
1015 POKEP1,204:POKEP2,204:EXECF
1:C=11:FORX=0TO20STEP20:FORY=X+6
0TOX+81STEP2:HDRAW"BM8,=Y;C=C;R2
39C8":NEXT:C=2:NEXT:HLINE(8,7)-(
247,59),PSET,BF::HDRAW"BM8,78C14
R40NU74E18U54R40D72R100NU72E18U5
4"
1020 HPAINT(10,10),13,14:HPAINT(
120,10),13,14:HPAINT(60,10),14,1
4:HPAINT(210,10),14,14:FORY=12TO
54STEP14:HLINE(12,Y)-(42,Y+10),P
SET,BF:HDRAW"BM12,=Y;C8NR30D10C4
R30U10C14":NEXT
1025 HDRAW"BM112,12C14R38D45L38N
U45EC8U43R36C4D43L36BR46R38U43C8
L38D43BGC14R40U45L40D45BE6R28U15
BU3U15L28D15R28BD3L28D15BEC4U13R
26C8D13L26BU18R26U13C4L26D13C0":
HLINE(167,38)-(190,49),PSET,BF:H
LINE(167,31)-(190,20),PSET,BF
1030 HCOLOR14,0:HLINE(117,15)-(1
45,54),PSET,BF:FORY=25TO44STEP19
:FORX=2TO9:HCIRCLE(131,Y),X,4:NE
XTX,Y:HDRAW"BM140,25C4D19LU19":F
ORY=20TO38STEP18:FORX=1TO10:HSET
(RND(21)+167,RND(10)+Y,RND(7)):N
EXTX,Y:HDRAW"BM114,65C8R84BD4L84
BD4R84BUC4L84BU4R84BU4L84
1035 RETURN
1040 POKEP1,68:POKEP2,68:EXECF1:
FORY=80TO100STEP2:HDRAW"BM8,=Y;C
12R239":NEXT:HDRAW"BM8,101C14E21
```

```
NM247,101":HPAINT(10,10),14,14:H
DRAW"C8U73RD73BM162,78U20M+16,+1
D20M-16,-1":HPAINT(164,76),13,8
1045 HDRAW"BU17BR7R4FD5GL5HU5EBD
2BRD3BR3U3BD8D3BL3U3BLBU2GD5FR5E
U5HL5":RETURN
1050 POKEP1,34:POKEP2,34:EXECF1:
HCIRCLE(120,70),70,14,.3:HCIRCLE
(120,70),72,14,.4,0,.5:HCIRCLE(1
20,70),72,14,.9,.5,1:HPAINT(120,
96),13,14:HPAINT(120,10),13,14:H
PAINT(120,70),3,14:HCIRCLE(120,5
0),20,14,.5,.6,.9
1055 HDRAW"BM68,28C14D10L2H2G2L3
R8BR105R2E2F2R3L9U10BM52,72E4F6E
12F6E8F6E8F6E6F6E6F6E6F8E6F8E6F1
2BM184,70G4H6G12H6G8H6G8H6G6H6G6
H6G6H8G6H8G6H12G6":HPAINT(66,32)
,4,14:HPAINT(174,32),4,14:HPAINT
(120,54),4,14:RETURN
1060 POKEP1,68:POKEP2,68:EXECF1:
FORY=61TO101STEP4:HDRAW"BM8,=Y;C
3R239":NEXT:Y=0:FORX=0TO56STEP8:
HLINE(128+X,61)-(128+X+Y,101),PS
ET:HLINE(128-X,61)-(128-X-Y,101)
,PSET:Y=Y+8:NEXT:
1065 FORX=74TO176STEP16:HPAINT(X
,62),3,3:NEXT:FORX=66TO188STEP20
:HPAINT(X,72),3,3:NEXT:FORX=52TO
202STEP24:HPAINT(X,80),3,3:NEXT:
FORX=35TO203STEP28:HPAINT(X,88),
3,3:NEXT:FORX=24TO216STEP32:HPAI
NT(X,96),3,3:NEXT
1070 FORX=80TO188STEP18:HPAINT(X
,68),3,3:NEXT:FORX=72TO204STEP22
:HPAINT(X,76),3,3:NEXT:FORX=58TO
214STEP26:HPAINT(X,84),3,3:NEXT:
FORX=45TO225STEP30:HPAINT(X,92),
3,3:NEXT:FORX=35TO227STEP32:HPAI
NT(X,100),3,3:NEXT
1075 HDRAW"BM8,60C14R239":HCIRCL
E(128,101),100,14,.4,.5,1:HPAINT
(10,70),15,14:HPAINT(10,10),8,14
:FORX=8TO246STEP4:HDRAW"BM=X;,7C
1D45":NEXT:HDRAW"BM247,60C0L239U
2R239U2L239U2R239U2NL239C14U20L1
0G8R18D20L18NU20,BL50E8U20NG8L179
D8NR171D20R171U20"
1080 HPAINT(10,50),10,14:HPAINT(
240,50),10,14:HPAINT(182,50),9,1
4:HPAINT(10,35),0,14:HPAINT(240,
35),0,14:HDRAW"BM78,36C13U29R40D
25G4NL36U10NL36U4NL36U15":HPAINT
(80,32),13,13:HPAINT(116,32),14,
13:HPAINT(80,10),3,13:HDRAW"BM84
,14C4F4R4E8R4F4DH4L4G8L4H
1085 C=0:FORX=84TO104STEP10:HCOL
ORC,0:HLINE(X,23)-(X+6,25),PSET,
BF:C=C+1:NEXT:RETURN
1090 POKEP1,0:POKEP2,0:EXECF1:HD
RAW"BM58,80C14F6R128E6U58H6L128G
```

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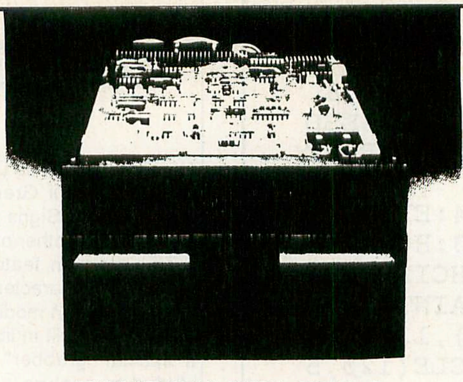

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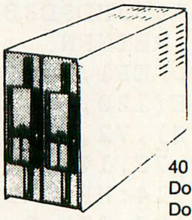

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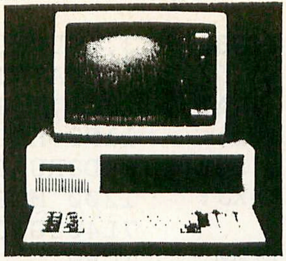

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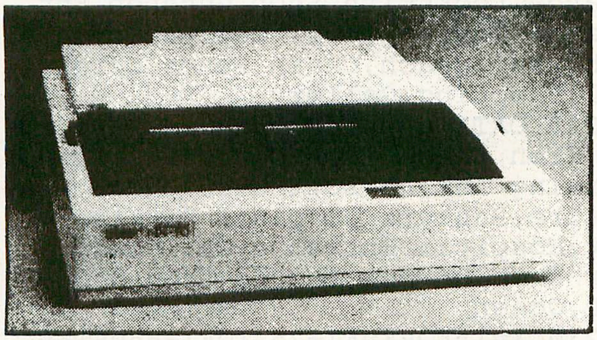

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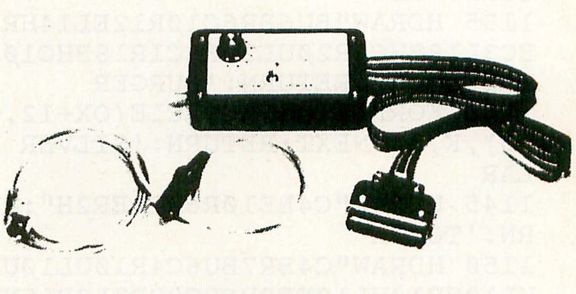

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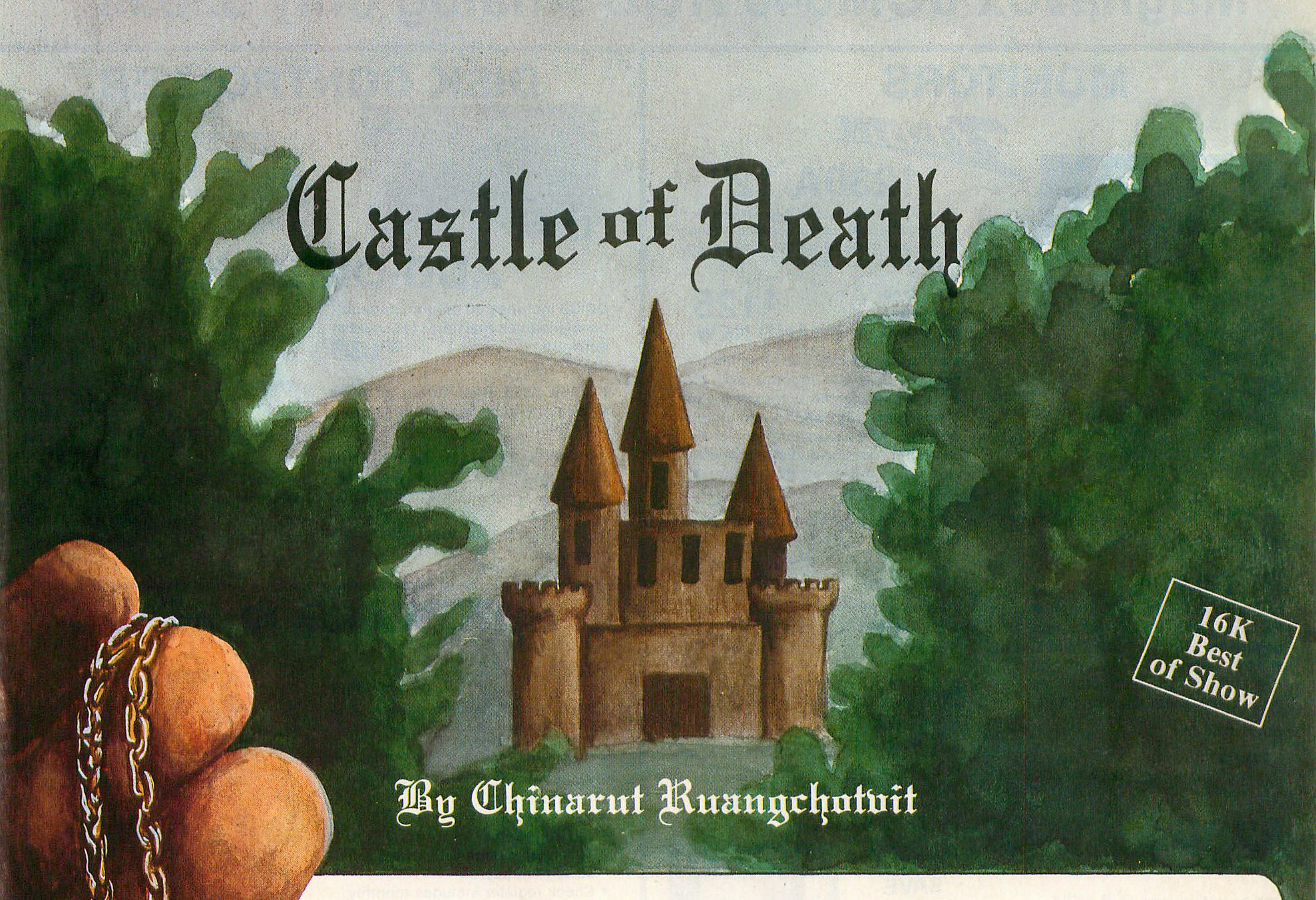
```
6D58":HPAINT(62,80),13,14:GOSUB2
10
1095 HCOLOR8,0:HPRINT(10,3),"RAI
NBOW CARD":HPRINT(9,9),"Member:
L. Falk":HPRINT(4,11),"Press But
ton to Continue":GOSUB170:JX=XJ:
JY=YJ:CD=0
1100 IFBUTTON(BU)THEN25ELSE1100
1105 POKEP1,136:POKEP2,136:EXECF
1:R$="TOTAL DARKNESS":GOTO80
1110 HSCREEN2:HCLS13
1115 HDRAW"C8BR10BU2L6C3HR8EL10C
8HR12E12LG12":RETURN:'CLUB
1120 HDRAW"C8BR15BU2R8UL8ER6UL6E
R4UL4M-3,-1R10UC3L10C8UL12UR22DL
10U2R4":RETURN:'GUN
1125 HDRAW"C8NE16RE16D4L10U4F16U
H15":RETURN:'WIRE CUTTER
1130 HDRAW"C8BU8BR2E4F4G4H4RE3F3
G3H3R20D3LU2L4D2LU2L4D2LU2L2":RE
TURN:'KEY
1135 HDRAW"BU6BR6C10R12EL14HR16B
EC3L18BHC8R20UL20BEC1R18BHC10L16
ER14HL12":RETURN:'BURGER
1140 FORK=1TO6:HCIRCLE(OX+12,OY-
10),K,14:NEXT:RETURN:'SILVER DOL
LAR
1145 HDRAW"C4BE10R6HL4ER2H":RETU
RN:'TOOTH
1150 HDRAW"C4BR7BU6C4R10UL10UR10
UL10UR10UL10ERBR6RC8BD3L2BL5NUNR
NDNL":RETURN:'BATTERY
1155 HDRAW"BE4C1R14UL14UR14UL14U
R14UL14UR14UL14UC9R16UNL12UNL8D1
0LU4NL14U5":RETURN:'CAKE
1160 HDRAW"C4BU8BR4R2EL4ER18FL4F
R2BU2BHL16HR18EL4ER2BL16L2GR4":R
ETURN:'BONE
1165 HDRAW"C3BR3U15RD15RU15RD15R
U15RD15RU15RD15RU15RD15RU15ND15B
LC8U2E2LG2D2BD7HLGLUR":RETURN:'G
AS
1170 HDRAW"C4BE4R16UL16UR16UL16U
R16UL16UR16UL16UR16UL16UR16UL16C
8F8E8L16D12R16U12":RETURN:'LETTE
R
1175 HDRAW"C8BR13U6L2D6RU6L6U6ED
7RU8ED9RU10ED11RU12FD11RU10FD9RU
8FD7RU6":RETURN:'SHOVEL
1180 HDRAW"C4BR8BU6R10EL12UR12UL
12UR12HL10D2C14DEFREBR2DERF":RET
URN:'CARD
1185 HDRAW"C8BR3BU6F2G2U4D2R5EF2
E2F2E2F2ER2":RETURN:'DRILL
1190 IFOY=186THENRETURNELSEHDRAW
"BM216,100C11BR2U10R10BD2D8NL10M
+13,-8U8NM-13,+6L10NM-13,+6U8M-1
3,+6D8HU6GD4":HPAINT(221,98),9,1
1:HPAINT(225,88),1,11:HPAINT(225
,82),3,11:RETURN:'TREASURE
1195 HDRAW"C2BE4BR4U8RD8RU8RD8RU
8RD8RU8D3E2RFD4L4":RETURN:'CUP
1200 HDRAW"C8BU9BR3R7DL7DR7DL7DR
7L4U2G5D13G9RE8U13E5RG5D13G9":RE
TURN
1205 FORY=80TO100STEP20:FORX=8TO
233STEP25:HDRAW"BM=X;,=Y;C8R25U2
0L25D20":NEXTX,Y
1210 RESTORE:BU=PEEK(F1+88):JH=B
U:JV=JH+1:PR=0
1215 CL$="BM20,10C4R40BDBL8L40BD
BR4R40BDBL3C13L30BR30BD4R30C4BEL
40BUBR20R30BEL35BR70BUR40BDBL10L
40BDBR5C13R14BR40BD2R14BUBR10C4L
40BUBR10R40BUBR4L40":FS$="C13R8B
EC4RL12HLR16BEC3RL20RBEC4R16LHL1
2RBEC13R8
1220 FORK=1TO34:READR$(K):NEXT:D
ATASubway,City Street, Pizza Hut
 Entrance,Pizza Hut, McDonald's
Entrance,McDonalds,Locksmith Ent
rance,Locksmith Shop,Gunshop Ent
rance,Gunshop,Golf Course,Ocean,
Sharks!,Beach,Chain Fence,Carniv
al,Shooting Gallery
1225 DATATunnel,Graveyard,Pastur
e,Iron Fence,Iron Gate,Falsoft P
arking Lot,Falsoft West Bldg.,Pa
sture,Pasture,Hospital Parking L
ot,Hospital Entrance,Hall,Comput
er Room,Corner,Battle Ground,Bea
ch,Ocean
1230 X=1:FORK=F1+252TOF1+650STEP
2:R(X)=PEEK(K):A(X)=PEEK(K+1):X=
X+1:NEXT
1235 D(0)=8:D(1)=4:D(2)=2:D(3)=1
:FORK=0TO4:V(K)=-1:NEXT
1240 FORK=0TO29:READO$(K),O(K):N
EXT
1245 DATAQuarter Pounder,20,Lase
r Gun,60,Femur Bone,161,Golf Clu
b,120,Chocolate Cake,48,Cup of C
offee,48,PLUG,43,Shark's Tooth,1
58,Wire Cutters,173
1250 DATAShovel,132,Key,40,Plast
ic Card,190,Silver Dollar,108,Dr
ill,10,Letter,24,Gas,27,Gas,80,G
as,200,Gas,192,Gas,171,Gas,181,G
as,61,Gas,88,Battery,76,Battery,
159,Battery,148,Battery,101,Batt
ery,86,Battery,111,Battery,47
1255 FORK=30TO35:O(K)=0:NEXT
1260 R=51:X=314:Y=4:JX=X:JY=Y:RE
TURN
```

Castle of Death



By Chinarut Ruangchotvit

You've heard stories throughout the village that there are jewels hidden in a nearby castle. Supposedly, the jewels are the famous South American Crown jewels that were lost years ago. According to legend, a lost king found the castle in the forest just beyond the village and decided to take shelter there. He never left and eventually died peacefully with his precious stones.

You quickly decide you must find the castle and the jewels. As the stories go, many others have gone before you, yet not one of them has ever returned. The jewels might already have been found. Also, some danger obviously exists, but it is a chance you feel you must take. After all, you are strong and wise. You have every confidence you can find the treasure.

After weeks of searching the forest, you finally stumble across a large fortress of a castle. All that remains is to find the jewels hidden inside. Or is it?

Loading and Playing

The Castle of Death is a text Adventure that will run on any CoCo with Extended Color BASIC. Due to memory limitations, in order to play the game on a 16K machine you must use a cassette-based system and enter `POKE 25, 6:NEW` before loading. This will clear enough memory for the program. If you have 32K of memory or more, you don't need to enter this command.

The Castle of Death involves a maze of rooms. Because of the nature of this Adventure, it would be very wise to map your progress through the castle. To move from room to room through the passageways, use the commands

---

Chinarut Ruangchotvit is 14 years old and lives in Ramsey, New Jersey. He has been programming on the Color Computer for the past three years.

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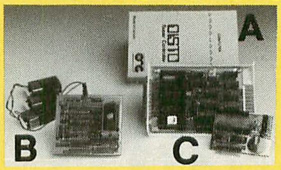

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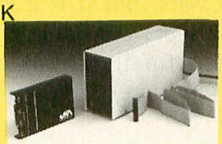

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VIP Writer III

WORD PROCESSOR • SPELLING CHECKER • PRINT SPOOLER

"...Nearly every feature and option possible to implement on the Color Computer. The design of the program is excellent; the programming is flawless." --The RAINBOW OCTOBER 1983

That's what they said about VIP Writer. Wait until they review VIP Writer III! We've added even more features and options to make the VIP Writer III the BEST word processor for the CoCo 3!

SCREEN DISPLAY OPTIONS

VIP Writer III has a screen of 32, 40, 64 or 80 characters wide by 24 lines using the CoCo 3's hardware display with actual lower case letters. You can choose foreground and background colors from up to 64 different hues. Color can be turned ON or OFF for the best possible display using a color or monochrome monitor or TV set. VIP Writer III has a built in on-line context sensitive help facility which displays command usage in easy to read colored windows. VIP Writer III also runs at double clock speed!

TEXT FILE STORAGE

There is a 48K text buffer and disk or cassette file linking allowing virtually unlimited text space. In addition, there is a 48K print spooler to allow you to print one document while editing another.

EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead, typamatic key repeat and key beep for flawless text entry, end of line bell, full four way cursor control with scrolling, top of textfile, bottom of textfile, page up, page down, top of screen, bottom of screen, beginning of line, end of line, left one word, right one word, DELETE character, to beginning or end of line, word to the left or right, or entire line, INSERT character or line, LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards, BLOCK copy, move or delete with up to TEN simultaneous block manipulations, TAB key and programmable tab stops, three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and disk file linking for continuous printing.

TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! All of these format parameters can be altered ANYWHERE within your text file.

TEXT FILE COMPATIBILITY

VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII file format. You can use VIP Writer III to create BASIC, assembly, PASCAL or C files. VIP Writer III also allows you to save and load files using DISK or CASSETTE in the case of an emergency. You can even read disk directories, display free space on a disk and kill disk files.

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P.O Box 1233. Gresham, OR. 97030
Ph. (503) 663-2865

PREVIEW PRINT WINDOW

The VIP Writer III features an EXCLUSIVE format window which allows you to preview your document BEFORE SENDING IT TO YOUR PRINTER! You are able to see margins, page breaks, orphan lines etc. This feature makes hyphenation a snap!

PRINTING

VIP Writer III supports most any printer serial or parallel using the parallel interface described in Nov-Dec. '87 RAINBOW magazine, or an external serial to parallel interface, and gives you the ability to select baud rates from 110 to 9600. You are able to imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has twenty PROGRAMMABLE PRINTER SEQUENCES which allow you to easily control all of your printers capabilities such as underline, bold, italics, superscript and subscript using simple keystrokes. Additional printer features include: single sheet pause, print pause, word length and line feed selection.

PRINT SPOOLING

VIP Writer III incorporates a built in print spooler which allows you to print one document WHILE you are editing another. You no longer have to wait until your printer is done printing before starting another job!

DOCUMENTATION

VIP Writer III is supplied with a 125 page instruction manual which includes a tutorial, glossary of terms and a complete index. The manual is well written and includes many examples to aid in understanding and application.

SPELLING CHECKER

VIP Writer III includes VIP Speller for NO ADDITIONAL COST! VIP Speller automatically checks text files for words to be corrected, marked for special attention or even added to the dictionary. You can even view the misspelled word in context! VIP Speller comes with a specially edited 50,000 word dictionary, and words can be added to or deleted from the dictionary or you can create one of your own.

THE ORIGINAL VIP WRITER

VIP Writer is also available for CoCo 1 and 2 owners and has all the features found in the VIP Writer III including VIP Speller except for the following: The screen display is 32, 51, 64 or 85 columns by 21 or 24 rows. Colors other than green, black or white are not supported. Help is not presented in colored windows. Double clock speed is not supported. Parallel printer interface is not supported. Printer spooler is not available. Even so, the VIP Writer is a CoCo 1 or 2 owners best choice in word processors.

VIP Writer III	**Disk**	**$79.95**
VIP Writer	**Disk**	**$69.95**
VIP Speller	**Disk**	**$34.95**

Please add $3.00 for shipping and handling. COD orders add an additional $2.00. Personal checks allow 3 weeks for delivery. All orders shipped the same day.

UP, DOWN, LEFT and RIGHT. Obviously, there is more than one floor to this castle. When referring to a door or window, you must specify its location. For example, to open a door on your left enter OPEN LEFT DOOR. Any time you open a door or window, you automatically go through it to the next room.

When the Adventure starts, you will have 40 strength points. If, during the course of your travels, your strength should drop to zero, you will lose one of your two "lives." (You are given a second chance.)

Many dangers lurk within the walls of the castle. You will have to fight many foes. Upon entering a room that contains an enemy, you will be forced to fight at least one round (a round consists of each combatant having one turn to hit the other). After each round, you will be given the option of continuing the fight or trying to escape. Make your decision carefully as some foes carry objects of great importance to your success. If you don't try to escape, the fight will continue until one of the combatants dies.

As you travel through the castle, be sure to use the SEARCH command to find any objects hidden in a particular room. Of course, many rooms will not contain any such items.

The STATUS command is used to determine your general condition and keep track of your current possessions. Enter SCORE to get a report on the number of moves you have made.

To save a game in progress, enter SAVE, then follow the prompts. When prompted for a filename, make sure your tape or disk is ready before pressing ENTER. The LOAD command works in the same manner.

One final word: *The Castle of Death* can be solved many different ways. The object is to complete the Adventure in as few moves as possible. Good Luck!

(Questions or comments concerning this program may be directed to the author at 242 Davidson Avenue, Ramsey, NJ 07446. Please enclose an SASE when writing for a response.) ☐

90	109	745	57
210	10	880	137
370	239	1080	54
470	73	2040	175
495	25	5300	233
506	128	5640	92
530	179	7000	99
548	213	END	207

The listing: CASTLE

```
0 GOTO20
1 FORX=1TO3000:NEXT:RETURN
2 A$=INKEY$:IFA$=""THEN2
3 PLAY"T2O1L8B":RETURN
4 PRINT"IT HITS YOU FOR"X"UNITS
OF        DAMAGE":HP=HP-X:PLAYD$:
RETURN
5 GOSUB1:GOTO200
6 PRINT"BUT LUCKILY IT MISSES":G
OTO3000
7 PLAY"T2L4P2O3CP96CL3FL4P24CFAP
64CFAP64CFAFAO4CO3AFCP64CP96CL3F
":RETURN
8 PRINT"EXCUSE ME BUT I DON'T HA
VE THAT "A$" IN MY VOCABULARY":G
OTO410
9 PRINT"THAT IS NOT POSSIBLE":GO
TO410
10 FORX=1TO1200:NEXT:RETURN
11 PRINT"PLEASE INDICATE WHICH "
A$:GOTO410
20 CLEAR300:CLS3:PRINT@72,"C A S
 T L E  O F";:PRINT@140,"D E A T
 H";:PRINT@226,"BY:";:PRINT@295,
"CHINARUT";:PRINT@363,"RUANGCHOT
VIT";
50 HP=40:DIM DL(67),DR(67),B(67)
,R(67),LU(67),LD(67),E(67),M(67)
,P(67),WR(67),WL(67),A(67),O(69)
90 FORX=8TO55:READDL(X):NEXT:FOR
X=7TO54:READDR(X):NEXT:FORX=2TO6
3:READB(X):NEXT:FORX=2TO9:READR(
X):NEXT:R(20)=1:FORX=28TO33:READ
R(X):NEXT:R(43)=1:R(55)=1:R(59)=
1
150 FORX=3TO55:READLU(X):NEXT:FO
RX=14TO66:READLD(X):NEXT:FORX=57
TO66:READWR(X):NEXT:FORX=57TO64:
READWL(X):NEXT
175 E(5)=1:E(24)=1:E(26)=1:E(35)
=1:A(2)=1:A(9)=1:A(19)=1:A(28)=1
:P(2)=1:P(13)=1:P(15)=1:P(17)=1:
P(21)=1:P(31)=1:P(26)=1:P(38)=1:
P(44)=1:P(50)=1:FORX=5TO57:READM
(X):NEXT
181 VL$="DROGETLOOOPEPULPUSUP DO
WGO LEFRIGSAVLOADRISCORAI":NL$="
   TRALEFRIGROPBUTSIDELEDOOWINGA
TPASLADSKESPEBROPOTKEYJEWMED
185 F$="YOU FIND ":M$="A MEDALLI
ON":T$="A BROADSWORD":X$="A MAGI
CAL SPEAR":W$="A GOLDEN KEY":Z$=
"WHEN YOU RAISE THE KEY,A ":Y$="
 MAGICALLY ":L$=" ON THE LEFT":R
$=" ON THE RIGHT":G$="A LADDER G
OING ":S$=STRING$(32,175):R=2:ML
=2:D$="T2L4O1DDD
200 IFR=1THEN5200
210 IFR=12ORR=23ORR=34ORR=45ORR=
56THEN5300
211 IFHP<=0THENQ=1:GOTO932
215 IFR=11ORR=47ORR=53THEN4000
220 IFG=1THEN240
230 IFM(R)=1THEN600
240 G=0:SI=0:PL=0:PR=0
250 CLS:PRINT"I SEE:",,S$
260 IF(RO=1ANDR=2)ORR=3THENPRINT
"A TRAP DOOR
265 IFR=67THENPRINT"JEWELS",,"A
SKELETON
270 IFDL(R)=1THENPRINT"A DOOR"L$
```

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	New for the Tandy 1000:	
	Gray Storm Rising: War in the North Atlantic	$25

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D — Disk only (no D means program available tape or disk)
HR — High Resolution   SG — Semigraphics   ML — Machine Language
MLS — Machine Language Subroutines   B — Basic

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```
275 IFR=2THENPRINT"THE GATE
276 IFR=54ANDKD=0THEN300
277 IFWD=1ANDR=54THEN300
280 IFDR(R)=1THENPRINT"A DOOR"R$
290 IFR=41ORR=50THENPRINT"A SIDE
 DOOR
300 IFR(R)=1THENPRINT"A ROPE FRO
M THE CEILING
310 IFB(R)=1THENPRINT"A BUTTON O
N THE WALL
320 IFWL(R)=1THENPRINT"A WINDOW"
L$
325 IFWW=1ANDR=63THEN340
330 IFWR(R)=1THENPRINT"A WINDOW"
R$
340 IFR=3ORR=6ORR=10OR(W1=1ANDR=
19)ORR=16ORR=18ORR=27ORR=51THENP
RINT"A SIDE WINDOW":SI=1
345 IFR=44ANDKL=0THEN360
350 IFLU(R)=1THENPRINTG$"UP
360 IFLD(R)=1THENPRINTG$"DOWN
370 IFE(R)=1THENPRINT"AN ELEVATO
R
380 IFR=2ORR=61ORR=62ORR=65THENP
RINT"A PASSAGE"L$:PL=1
385 IFR=60ORR=61ORR=64THENPRINT"
A PASSAGE"R$:PR=1
390 IFO(1)=R THENPRINTT$
392 IFO(2)=R THENPRINTX$
394 IFO(3)=R THENPRINTW$
395 IFO(R+2)=R THENPRINT"A POTIO
N
396 IFO(0)=R THENPRINTM$
410 PRINTS$;:LINEINPUT"NOW WHAT
->";A$
415 IFLEN(A$)<2THEN410
416 MO=MO+1:J$=LEFT$(A$,3)
417 IFJ$="STA"THEN990
418 IFJ$="SEA"THEN543
420 V$=LEFT$(A$,3):N$=""
421 IFLEN(A$)<6THEN455
430 N=INSTR(A$," "):N$=MID$(A$,N
+1,3)
455 D=INSTR(A$," DO"):W=INSTR(A$
," WI")
460 V=INSTR(VL$,V$):IFV=0THENA$=
"VERB":GOTO8
470 N=INSTR(NL$,N$):IFN=0THENA$=
"NOUN":GOTO8
480 V=(V+2)/3:ON V GOTO527,516,4
85,502,509,510,511,512,513,514,5
15,5400,5500,537,538,539
485 IFN=25ORD>9THENPRINT"IF YOU
ASK ME, THEY ARE JUST    NORMAL
WOODEN DOORS":GOTO410ELSEIFN=28O
RW>9THENPRINT"HMMM...IT APPEARS
TO BE VERY    DARK OUTSIDE":GOTO
410
486 IFN=13ANDR(R)=1THENPRINT"IT
LOOKS LIKE A NATURAL FIBER   ROP
E, SISAL I THINK":GOTO410
487 IFN=16ANDB(R)=1THENPRINT"THE
 BUTTON LOOKS VERY WORN DOWN":GO
TO410
488 IFN=22ANDE(R)=1THENPRINT"IT'
S A ROTTEN,WOODEN ELEVATOR   WIT
H A RUSTED PULLEY ON IT":GOTO410
489 IFN=43ANDSP=1THENPRINT"IT'S
A FINELY CRAFTED SPEAR    INDEE
D":GOTO410
490 IFN=46ANDSW=1THENPRINT"IT'S
APPEARS TO BE VERY NEW AND HAS A
N EYE OF THE TIGER NEAR THEHANDL
E":GOTO410
491 IFN=49ANDP>0THENPRINT"THE PO
TION IS A VERY DARK BLUE  AND HA
S A FOUL SMELL":GOTO410
492 IFN=52ANDK=1THENPRINT"THE KE
Y APPEARS TO BE MADE OUT OF PUR
E GOLD":GOTO410
493 IFN=1THENGOTO200
494 IFN=31ANDR=2THENPRINT"IT IS
A DOUBLE HINGED IRON GATE":GOTO4
10
495 IFN=34AND(PL=1ORPR=1)THENPRI
NT"MAYBE THE PASSAGE LEADS NOWHE
RE,WHO KNOWS?":GOTO410
496 IFN=37AND(LU(R)=1ORLD(R)=1)T
HENPRINT"THEY'RE CARVED WOODEN L
ADDERS":GOTO410
497 IFN=40ANDR=67THENPRINT"IT'S
AN UGLY HUMAN SKELETON":GOTO410
498 IFN=55ANDR=67THENPRINT"I COU
LD SWEAR IT'S THOSE JEWELS YOU'R
E AFTER!!":GOTO410
499 IFN=58ANDME=1THENPRINT"IT IS
 A VERY BEAUTIFUL SOLID    GOLD
MEDALLION":GOTO410
500 IFN>42THENPRINT"YOU DO NOT H
AVE IT"ELSEPRINT"THE PRESENCE OF
 THAT IS ABSENT
501 GOTO410
502 IFN=31THENPRINT"IT IS ALREAD
Y OPEN SIR":GOTO410
503 IFW>9ORD>9THEN504ELSEIFN=25T
HENA$="DOOR":GOTO11ELSEIFN=28THE
NA$="WINDOW":GOTO11ELSE9
504 IFN=4AND(RO=1ORR=3)THENGOTO5
550
505 IFN=7AND(DL(R)=1ORWL(R)=1)TH
ENR=R-1:GOTO200
506 IFN=10AND(DR(R)=1ORWR(R)=1)T
HENR=R+1:IFR=67THENGOSUB6000:GOT
O200ELSE200
507 IFN=19ANDD>9AND(R=41ORR=50)T
HENPRINT"YOU SMASH YOUR FACE INT
O A      BRICKWALL AND TAKE A HI
T POINT  OF DAMAGE":HP=HP-1:GOTO
410
508 IFN=19ANDW>9ANDSI=1THENGOTO5
750
509 IFN=13ANDR(R)=1THEN1060ELSEP
```

```
RINT"YOU ARE UNABLE TO DO THAT F
EAT":GOTO410
510 IFN=16ANDB(R)=1THEND=0:GOTO1
049ELSEPRINT"THAT DIDN'T DO A TH
ING":GOTO410
511 IFLU(R)=1THENR=R+11:GOTO200E
LSEPRINT"WHAT??":GOTO410
512 IFLD(R)=1THENR=R-11:GOTO200E
LSEPRINT"WHAT??":GOTO410
513 IFN=22THEN1000ELSE9
514 IFPL=1THENR=R-1:GOTO200ELSE9
515 IFPR=1THENR=R+1:GOTO200ELSE9
516 IFN=43ANDO(2)=R THENSP=1:O(2
)=0:GOTO526
517 IFN=46ANDO(1)=R THENSW=SW+1:
O(1)=0:GOTO526
518 IFN=49ANDO(R+2)=R THENP=P+1:
O(R+2)=0:GOTO526
519 IFN=52ANDO(3)=R THENK=1:O(3)
=0:GOTO526
520 IFN=58ANDO(0)=R THENME=1:PM=
0:O(0)=0:GOTO526
521 IFN<>55ORR<>67THEN525
522 IFPM=1THEN7000
523 IFPM=0THENPRINT"THE SKELETON
 SUDDENLY RISES AND SAYS, DON'T
YOU DARE TOUCH MY  JEWELS!! HE
 THEN STRANGLES YOU TO DEATH SO
YOU CAN ALSO LIE    PEACEFULLY N
EXT TO HIM WITH HIS JEWELS.":HP=
0:Q=1:R=2:GOTO932
525 PRINT"I AM UNCAPABLE OF TAKI
NG THAT":GOTO410
526 PRINT"IT IS NOW TAKEN":GOTO4
10
527 IFN=43ANDSP=1THENSP=0:O(2)=R
:GOTO536
528 IFN=46ANDSW>0THENSW=SW-1:O(1
)=R:GOTO536
529 IFN=49ANDP>0THENP=P-1:O(R+2)
=R:GOTO536
530 IFN=52ANDK=1THENK=0:O(3)=R:G
OTO536
531 IFN=58ANDME=1THENME=0:O(0)=R
:PRINT"FAINTLY, YOU HEAR A VOICE
 SAY   THANK YOU":PM=1:GOTO410
535 PRINT"I DON'T THINK YOU CAN
DROP THAT":GOTO410
536 PRINT"YOU HAVE NOW DROPPED I
T":GOTO410
537 IFN=49ANDP>0THENA=40-HP:PRIN
T"AHHH....THAT WAS REFRESHING. I
T GIVES YOU"A"UNITS OF STRENGTH"
:HP=40:P=P-1:G=1:GOTO410ELSEIFP<
=0ANDN=49THENPRINT"YOU DON'T HAV
E ANY!!!":GOTO410ELSEPRINT"I WOU
LDN'T ADVISE THAT":GOTO410
538 MO=MO-1:PRINT"YOUR SCORE IS"
```

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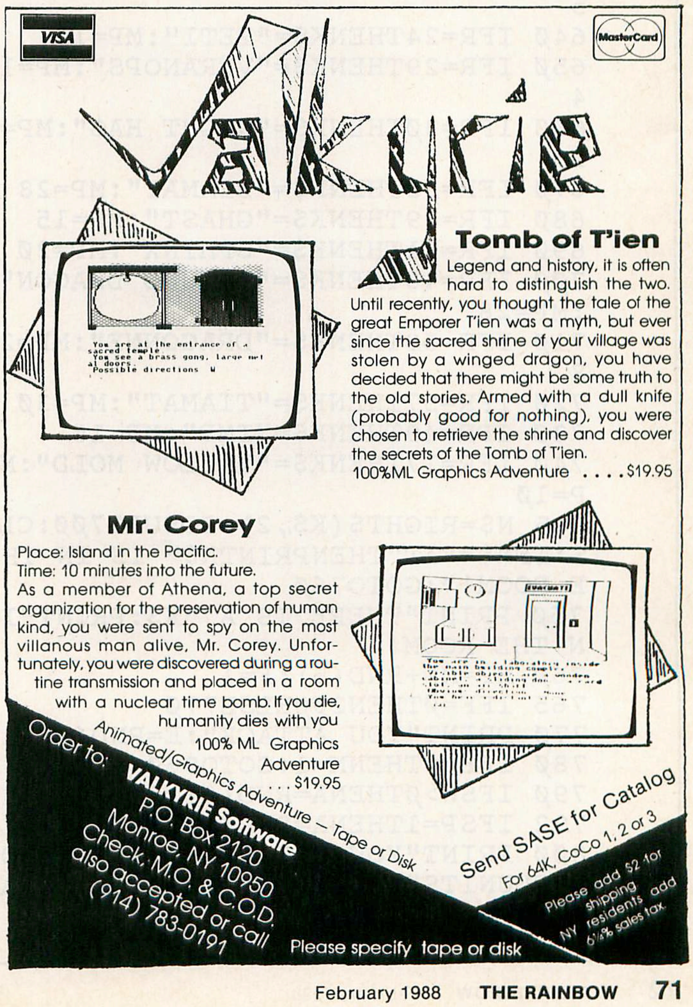
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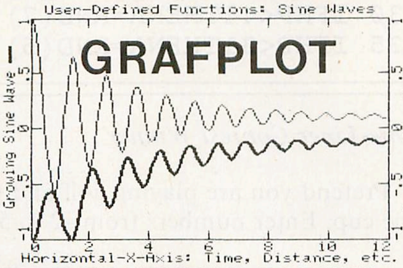
```
MO"MOVES":GOTO410
539 IF(N=52ANDK=0)THENPRINT"YOU
DON'T HAVE A KEY!":GOTO410
540 IFN=52ANDR=44THENGOSUB5620:G
OTO200
541 IFN=52ANDR=54THENKD=1:GOSUB5
610:GOTO200
542 PRINT"A NICE ATTEMPT":GOTO41
0
543 IFR=2THENPRINTF$"A TRAP DOOR
":RO=1:GOTO5
544 IFR=52ORR=48THENPRINTF$G$"UP
":LU(R)=1:GOTO5
546 IFR=19THENPRINTF$"A SIDE WIN
DOW":W1=1:GOTO5
547 IFR=58THENPRINTF$"A WINDOW"L
$:WL(R)=1:GOTO5
548 IFR=3THENPRINTF$"AN ELEVATOR
":E(3)=1:GOTO5
549 IFR=21ORR=36THENPRINTF$"A BU
TTON":B(R)=1:GOTO5
550 IFR=39THENPRINTF$"A DOOR"L$:
DL(R)=1:GOTO5
560 PRINT"YOU FIND NOTHING":GOTO
410
600 IFR=5THENK$="LICH":MP=20
610 IFR=8THENK$="QUASSIT":MP=21
620 IFR=18THENK$="MIND FLARE":MP
=15
630 IFR=22THENK$="BUG BEAR":MP=1
5
640 IFR=24THENK$="YETI":MP=15
650 IFR=29THENK$="VERANOPS":MP=1
4
660 IFR=30THENK$="NIGHT HAG":MP=
15
670 IFR=32THENK$="BIAMAT":MP=28
680 IFR=39THENK$="GHAST":MP=15
690 IFR=41THENK$="SPHINX":MP=20
700 IFR=48THENK$="PSEUDO DRAGON"
:MP=28
710 IFR=52THENK$="DRAGONNE":MP=2
8
720 IFR=57THENK$="TIAMAT":MP=30
730 IFR=49THENK$="IMP":MP=15
740 IFR=17THENK$="YELLOW MOLD":M
P=10
745 N$=RIGHT$(K$,2):GOSUB5700:CL
S:IFN$="AT"THENPRINTK$" IS IN TH
E ROOM!":GOTO760
750 PRINT"THERE IS A "K$:PRINT"I
N THE ROOM!
760 MP=MP+RND(5):F=1
765 IFF=0THEN200ELSE770
770 PRINT"YOU ATTACK":E=RND(7)-1
780 IFE=0THENM=1:GOTO860
790 IFSW>0THENA=RND(6):E=E+A
792 IFSP=1THENA=RND(3):E=E+A
800 PRINT"YOU HIT "H$K$:PRINT"FO
R"E"UNITS":MP=MP-E:PLAY"T2L4O3AA
A":IFMP=<0THEN920
```

```
805 PRINTH$K$" ATTACKS
810 X=RND(7)-1:IFX=0THENM=2:GOTO
860
820 PRINTH$K$" HITS YOU":PRINT"F
OR"X"UNITS":HP=HP-X:PLAYD$:IFHP=
<0THEN932
830 PRINT"YOU HAVE"HP"POINTS OF
STRENGTH":PRINTH$K$" HAS"MP:PRIN
T"POINTS OF STRENGTH
840 PRINT"TRY TO ESCAPE(Y/N)
845 GOSUB2
850 IFA$="N"THEN940
852 IFA$="Y"THEN5630ELSE845
858 PRINTH$K$" STOPS YOU":GOTO94
0
860 IFM=1THENPRINT"YOU MISSED":G
OTO810
880 IFM=2THENPRINT"THE "K$" MISS
ES":GOTO830
920 GOSUB7
930 IFMP=<0THENPRINT"YOU HAVE KI
LLED "H$:PRINTK$:M(R)=0:GOSUB1:F
=0:IFR=57THEN6500ELSE200
932 IFHP=<0THENML=ML-1
935 IFML=0THENPRINT"YOU ARE DEAD
":GOTO980
936 PRINT"YOU HAVE NO MORE HP'S"
,"LIVES LEFT:";ML-1:HP=40:IFQ TH
ENGOSUB1ELSE840
937 GOTO200
940 GOTO765
980 PRINT:PRINT"PLAY AGAIN(Y/N)
985 GOSUB2:IFA$="Y"THENRUNELSEIF
A$="N"THENCLS:ENDELSE985
990 PRINT"YOU HAVE:":PRINTHP"UNI
TS OF STRENGTH":PRINTP"POTIONS":
PRINTML-1;:IFML=2THENPRINT"LIFE"
;ELSEPRINT"LIVES";
991 PRINT" LEFT":IFSW>0THENPRINT
" "T$
992 IFSP=1THENPRINT" "X$
993 IFK=1THENPRINT" "W$
994 IFME=1THENPRINT" "M$
995 GOTO410
1000 IFR=3THENR=24ELSEIFR=24THEN
R=3
1010 IFR=5THENR=26ELSEIFR=26THEN
R=5
1020 IFR=35THEN5000
1025 IFE(R)=1THEN200ELSEPRINT"AR
E YOU CRAZY, I DON'T SEE AN   EL
EVATOR AROUND HERE":GOTO410
1049 IFR=2ORR=55THEND=1
1060 IFA(R)=1ANDD=0THENX=RND(3):
A=RND(4)-1:PRINTX;"ARROWS SHOOT
OUT AND ";:IFA=0THEN1065ELSEPRIN
T"HIT YOU  FOR"A"UNITS OF DAMAGE
":HP=HP-A:PLAYD$:GOTO3000
1061 GOTO1070
1065 PRINT"LUCKILY, THEY MISS YO
U":GOTO3000
```

```
1070 IFP(R)=1THENPRINT"A POTION
DROPS ONTO THE FLOOR":O(R+2)=R:P
(R)=0:GOSUB5720:GOTO3000
1075 IFB37=1ANDR=37THEN2900
1076 IFR3=1ANDR=3THEN2900
1080 IFR=3ORR=37THENPRINTT$" LIE
S ON THE FLOOR":O(1)=R:IFR=3THEN
R3=1:GOSUB5720:GOTO3000
1081 IFR=37THENB37=1:GOSUB5720:G
OTO3000
1084 IFB7=1ANDR=7THEN2900
1085 IFR=7THENPRINTX$" LIES IN F
RONT OFYOU":O(2)=R:B7=1:GOSUB572
0:GOTO3000
1090 IFR=14ORR=43THENPRINT"A AXE
 SWINGS OUT AT YOU!":A=RND(2)-1:
X=RND(2):IFA=0THEN6ELSEGOSUB4:GO
TO200
1095 IFB59=1ANDR=59THEN2900
2000 IFR=59THENPRINT"THERE IS NO
W "W$" ON THEFLOOR":O(3)=R:B59=1
:GOSUB5720:GOTO3000
2005 IFR=4THENPRINT"YOU FALL DOW
N A TRAP DOOR":R=7:GOTO3000
2010 IFR=20THENPRINT"SUDDENLY YO
U ARE HYPERSPACED        INTO ANOTH
ER ROOM!":R=46:GOTO3000
2012 IFR=40THEN2025
2015 IFR=25ORR=36THENPRINT" A SL
EEPING GAS SEEPS INTO THE      ROO
M AND WHEN YOU WAKE UP, YOU  ARE
 IN ANOTHER ROOM!
2020 IFR=25THENR=48ELSEIFR=36THE
NR=40
2021 IFR=40ORR=48THENGOSUB1:GOTO
3000
2025 IFR=33THENPRINT"AN KNIFE SH
OOTS OUT AT YOU!":X=RND(2):A=RND
(2)-1:IFA=0THEN6ELSEGOSUB4:GOTO2
00
2035 IFR=42THENPRINT"A FLAME SHO
OTS OUT!":A=RND(2)-1:X=2:IFA=0TH
EN6ELSEGOSUB4:GOTO200
2037 IFWW=1ANDR=63THEN2900
2038 IFWD=1ANDR=54THEN2900
2040 IFR=40ORR=54ORR=63THENPRINT
"A WALL SLAMS RIGHT IN FRONT OF
  YOUR FACE!":GOSUB6010
2045 IFR=40THENPRINT"YOU ARE TRA
PPED! IT COSTS YOU A LIFE TO GET
 OUT":HP=0:Q=1:GOTO932
2050 IFR=54THENWD=1:GOTO3000
2055 IFR=63THENWW=1:GOTO3000
2800 IFR=55ANDD=1THENPRINT" A CH
ANDELIER DROPS ON YOUR      HEAD
! YOU BLEED TO DEATH!":HP=0:Q=1:
GOTO932
2900 PRINT"NOTHING HAPPENS
```



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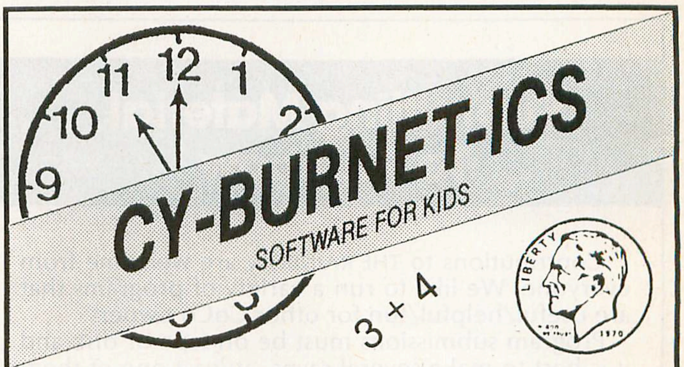

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```
3000 GOSUB10:D=0:GOTO200
4000 PRINT" AS YOU GO DOWN THE L
ADDER,YOU   GET YOURSELF INTO A
TRAP!
4005 IFR=11THENA=RND(2)
4010 IFR=47THENA=RND(3)
4020 IFR=53THENA=RND(4)
4035 PRINT"YOU TAKE"A"UNITS OF D
AMAGE","TRYING TO ESCAPE":HP=HP-
A:PLAYD$
4050 IFR=11THENR=22
4060 IFR=47THENR=58
4070 IFR=53THENR=64
4080 GOTO3000
5000 PRINT" YOU ARE STUCK IN THE
 ELEVATOR!":A=RND(3)
5010 PRINT"YOU TAKE"A"UNITS OF D
AMAGE","TRYING TO ESCAPE":HP=HP-
A:PLAYD$
5110 GOTO3000
5200 PRINT"YOU ARE BACK OUTSIDE!
,BUT YOU    SAY TO YOURSELF, I MU
ST GET      THOSE PRECIOUS JEWELS
":R=2:GOSUB1:GOTO200
5300 GOSUB6000:PRINT" YOU FALL I
NTO THE MOAT,AND GET  EATEN ALIV
E BY CROCODILES!":HP=0:Q=1:R=2:G
OTO932
5400 GOSUB5600:IFN=-1THEN5410ELS
E5420
5410 OPEN"O",#N,A$:FORX=5TO57:PR
INT#N,M(X):NEXT:FORX=2TO50:PRINT
#N,P(X):NEXT:FORX=0TO69:PRINT#N,
O(X):NEXT:PRINT#N,R,HP,ML,SW,SP,
G,P,F,K,WD,WW,B37,R3,B7,B59,MO:C
LOSE#N:END
5420 OPEN"O",#N,A$:FORX=5TO57:WR
ITE#N,M(X):NEXT:FORX=2TO50:WRITE
#N,P(X):NEXT:FORX=0TO69:WRITE#N,
O(X):NEXT:WRITE#N,R,HP,ML,SW,SP,
G,P,F,K,WD,WW,B37,R3,B7,B59,MO:C
LOSE#N:END
5500 GOSUB5600
5510 OPEN"I",#N,A$:FORX=5TO57:IN
PUT#N,M(X):NEXT:FORX=2TO50:INPUT
#N,P(X):NEXT:FORX=0TO69:INPUT#N,
O(X):NEXT:INPUT#N,R,HP,ML,SW,SP,
G,P,F,K,WD,WW,B37,R3,B7,B59,MO:C
LOSE#N:A=1:GOTO210
5550 IFR=2THENR=3ELSEIFR=3THENR=
2
5560 GOTO200
5600 CLS:PRINT"tAPE,dISK,OR rETU
RN TO GAME
5601 GOSUB2:IFA$="R"THEN200ELSEI
FA$="T"THENN=-1ELSEIFA$="D"THENN
=1ELSE5601
5602 INPUT"MAY I ASK THE NAME OF
 YOUR GAME";A$
5605 RETURN
5610 PRINTZ$"DOOR"R$Y$"OPENS":IF
WD=1THENPRINT" BUT A WALL IS BLO
CKING IT
5615 GOSUB1:RETURN
5620 IFWD=0THEN538
5621 PRINTZ$"LADDER"Y$"APPEARS":
KL=1:GOSUB1:RETURN
5630 IFHP<41THENA=RND(7)
5635 IFHP<31THENA=RND(5)
```

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submissions Editor, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

One-Liner Contest Winner . . .

Pretend you are playing golf and putt the ball into the cup. Enter numbers from -2 to 5 to take aim.

The listing:

```
10 S=30:Y=RND(188)+2:PMODE3:PCLS
:SCREEN1,0:CIRCLE(170,66),6,3,.5
:PAINT(170,66),3:FORI=1TOS:CIRCL
E(2,Y),3,2:NEXT:INPUTS:SCREEN1,0
:FORX=2TO173STEP7:CIRCLE(X,Y),3,
2:CIRCLE(X,Y),3,1:Y=Y-S:NEXT:IFY
<70ANDY>63THENPLAY"O2;L24;12;12;
O3;1;3;9;7;5":END:ELSERUN
```

Brad Lowe
Lafayette, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)

```
5640 IFHP<21THENA=RND(3)
5645 IFHP<11THENA=RND(2)
5650 IFHP<5THENA=1
5655 IFA=1THENG=1:GOTO200
5660 GOTO858
5700 IFN$="AT"THENH$=""ELSEH$="T
HE "
5710 RETURN
5720 PLAY"T4O3L4CCCL3GL4CL2G":RE
TURN
5750 IFR=3THENR=6ELSEIFR=6THENR=
3
5755 IFR=10THENR=19ELSEIFR=19THE
NR=10
5760 IFR=16THENR=18ELSEIFR=18THE
NR=16
5765 IFR=27THENR=51ELSEIFR=51THE
NR=27
5770 PRINT" YOU CLIMB OUT OF THE
 WINDOW AND GO INTO ANOTHER WIND
OW":GOSUB1:GOTO200
6000 A$="BAGFEDC":PLAY"T9L4O5XA$
;O4XA$;O3XA$;
6010 PLAY"L4P2T5O1V30":FORX=1TO
30:PLAY"V-D":NEXT:PLAY"V15":RETU
RN
6500 PRINT"AFTER A FEW SECONDS,
YOU WATCH  AS THE CORPSE OF TIAM
AT TURNS    INTO "M$:O(0)=57:GOSU
B1:GOTO200
7000 PRINT" YOU DID IT! YOU TAKE
 THE JEWELS AND GO HOME RICH FOR
 LIFE!        YOU FINISHED THE ADV
ENTURE        IN"MO"MOVES":GOTO980
8000 DATA1,1,,,,,1,1,,1,,,,,1,,,
1,1,,,1,,1,1,1,,,1,,1,,,,1,,1,,,
,,1,,,1,,,1
8001 DATA1,1,,,,,1,1,,1,,,,,1,,,
1,1,,,1,,1,1,1,,,1,,1,1,,,1,,1,,
,,,1,,,1,,,1
8002 DATA1,,1,,,1,,,,,,1,1,1,,1,
,1,,,,,,1,1,,,,,,,,,,,1,1,,1,,1,
,1,,,,,,1,,,,1,1,,,,,,,,1
8003 DATA1,1,,,,,,1,1,,,1,,1
8004 DATA1,1,1,1,1,1,1,1,1,,1,,1
,1,1,,,,,1,,,,1,,,1,1,,,1,,1,,,1
,,,,,1,1,,,1,,,1,,,1,,1
8005 DATA1,1,1,1,1,1,1,1,1,,1,,1
,1,1,,,,,1,,,,1,,,1,1,,,1,,1,,,1
,,,,,1,1,,,1,1,,1,1,,1,,1
8006 DATA1,1,1,,,1,1,,,1
8007 DATA1,,1,1,,,1,1
8008 DATA1,,1,,,,,,,,,1,1,,,,,1,
,1,,,,,1,1,,1,,,,,,,1,,1,,,,,,,1
,1,,,1,,,,,1
8100 ' CASTLE OF DEATH
8101 ' BY CHINARUT RUANGCHOTVIT
8102 ' 242 DAVIDSON AVENUE
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Expense estimating, Part II

Restaurant Reckonings

By Steve Blyn
Rainbow Contributing Editor

Last month we visited a fast-food restaurant and worked on estimating expenses. This month, we ask the children to actually calculate the same expenses.

The program sends us back to our fast-food restaurant. Again, we see only part of the menu on our screen, where four food items are visible: a chicken sandwich, a salad, a soda and coffee. The computer chooses two of these items for each example, and the prices are randomly selected within a reasonable range of values.

Last month, the students were asked whether or not a certain random sum of money was enough for these two purchases. This month, they are asked for the correct amount of money they will need to make the combined purchase.

There are several alternatives in computing the amount. Using pencil and paper is the way that first comes to mind. If this program is used in a classroom, one or more students could work simultaneously at the blackboard on the same example. Alternatively, since there are only two values to be added, more advanced students could be taught to do the addition mentally. Lastly, a combination of two of the preceding might be a possibility. For instance, try the example first mentally and then check it on paper or the blackboard before entering the answer on the computer.

This program is very similar to last month's program. Lines 40 through 110 draw the menu and then select food prices for each example. The variables `CH`, `SA`, `SD` and `CO` determine the prices for each item. Line 130 sends the program temporarily to lines 250 through 300, where the two items highlighted in this example are chosen.

Line 150 asks the student to enter the total amount of the bill he or she must pay for the two items. Lines 160 through 190 calculate whether the response is correct. If it's incorrect, the correct answer will be displayed. The variable `FZ` becomes the child's answer. The computer determines the correct answer by adding the variables `AA` and `BB`; `AA` represents the price of the food item selected and `BB` represents the price of the drink.

After studying the answer, the student presses the ENTER key to call up two more randomly selected food items and their prices.

After the student has gone through 10 trials, a scorecard is presented. Ten points are counted for each correct trial. Then the student is asked if he or she wants to try the program again. The program may now be ended by pressing the N key or started again by pressing the Y key.

We hope this program, in combination with last month's program, helps your students to become more adept at calculating purchases. ☐

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: `SHOPPING`

```
10 REM"FAST FOOD SHOPPING"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1988"
30 CLS5:D=RND(-TIMER):IF CT=10 T
HEN 310
40 PRINT@3,"YOUR MENU";:PRINT@25
,"#";CT+1;
50 FOR T=1056TO1087:POKET,243:NE
XT:SOUND100,3
60 CH=120+RND(40):PRINT@98,"CHIC
KEN-$";:PRINTUSING"#.##";CH/100;
70 SA=70+RND(20):PRINT@162,"SALA
D  -$";:PRINTUSING"#.##";SA/100;
80 SD=32+RND(20):PRINT@114,"SODA
  -$";:PRINTUSING"#.##";SD/100;
90 CO=40+RND(20):PRINT@178,"COFF
EE-$";:PRINTUSING"#.##";CO/100;
100 FOR T=1248 TO 1279
110 POKET,252:NEXTT:SOUND200,2
120 'PLAY"O4;L80;ABDBDBDBGG"
130 PRINT@256,"YOU ARE GOING TO
BUY A "
140 GOSUB 250:PRINT@288,N1$;" AN
D A ";N2$
150 PRINT@352,"";:LINE INPUT"<EN
TER> YOUR TOTAL BILL- $";FZ$
160 CT=CT+1:FF=VAL(FZ$)
170 FZ=INT((FF*100)+.9)
180 IF FZ=AA+BB THEN 200
190 IF FZ<>AA+BB THEN 220
200 RI=RI+1:PRINT@428,"CORRECT";
```

```
210 FOR T=200TO255STEP11:SOUNDT,
1:NEXTT:GOTO 230
220 PRINT@416,"SORRY,THE ANSWER
IS $";:PRINTUSING"#.##";(AA+BB)/
100:SOUND 10,3
230 PRINT@484,"PRESS <ENTER> TO
GO ON ";
240 EN$=INKEY$:IF EN$=CHR$(13) T
HEN 30 ELSE 240
250 RN=RND(2):RR=RND(2)
260 IF RN=1THENN1$="CHICKEN":AA=
CH
270 IF RN=2 THEN N1$="SALAD":AA=
SA
280 IF RR=1 THEN N2$="SODA":BB=S
D
290 IF RR=2 THEN N2$="COFFEE":BB
=CO
300 RETURN
310 CLS8:FOR T=1024TO1055:POKET,
214:PLAY"L100;G":NEXT:PRINT@37,"
HERE IS YOUR SCORECARD";
320 FOR T=1119TO1088STEP-1:POKET
,214:PLAY"L100;A":NEXTT
330 PRINT@202,"SCORE = ";10*RI;"
%";
340 FOR T=1344TO1375:POKET,214:P
LAY"L100;A":NEXT T
350 PRINT@416," ":PRINT@448," ":
PRINT@418,"DO YOU WANT TO PLAY A
GAIN? ";
360 EN$=INKEY$
370 IF EN$="Y" THEN RUN ELSE IF
EN$="N" THEN END ELSE 360
```

Two-Liner Contest Winner . . .

Many of us have felt frustration when our computer "makes an error." Here is one way to relieve those feelings.

The listing:

```
10 PMODE2,1:PCLS5:A$="BM80,130S6
C0D15R10U15L10D20R20U3M95,152BM8
0,132G5D3F5BM70,160R30D5L30U5D30
R5U16R20D30R5U20BM150,130R5D40L1
5U4E3R3U10H5U10E8H3U4E3R4F3D4G3"
:DRAW"XA$;BM153,140M125,160M120,
155M148,135M153,140"
20 DRAW"BM125,160H13G5F3E3F10E4"
:PMODE2,3:PCLS5:DRAW"XA$;BM148,1
40M127,118M130,115M153,135M148,1
40BM127,118E13H5G3F3G10F4":FORI=
0TO1STEP0:A=P*2+1:PMODE2,A:SCREE
N1,A:FORO=1TO500:NEXTO:P=-SGN(P)
+1:NEXTI
```

Arron Becwar
Mt. Sterling, WI

(For this winning two-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

VCR Tapes Update

By Randy Mayfield

After my program, *VCR Tapes* (December 1987, Page 92), was submitted for publication, I purchased a new video cassette recorder. The digital counter display on the new model did not increment at the same rate as the old model. This made all counter records on the printouts and labels meaningless when using the new recorder. Since I did not envision this problem when I wrote the program, there was no provision in *VCR Tapes* to change an entry. I have a patch, however, and would like to share it with any readers who are experiencing the same problem.

The following changes and insertions will allow the user to change a title, tape number or counter number individually. The Change function is added as part of the Work in a File option and allows scrolling through an existing file to find the entry to change. Press the C key and you will be given four choices: 1) Change title; 2) Change tape number; 3) Change counter number; and 4) Return to work menu. Just enter the appropriate new data when prompted.

Make these changes to existing lines:

Line 110: after the word `DELETE` insert `, CHANGE`
Line 340: after the number `3` insert `CHANGE":PRINT"4`
Line 360: change the number `3` to `4`
Line 370: change the first number `3` to `4`
Line 460: remove the apostrophe and insert
`L$=MID$(T$(X);1,L): Q$=MID$(T$(X), L+1,3): T$(X)=L$+Q$+R$: GOTO 340`
Line 920: before the `ELSE 110` at the end of the line, insert `ELSE IF R$="C" AND W=3 THEN 452`

And add the following new lines:

```
375 IF W=3 THEN 451
451 CLS:X=X+1:PRINT"FIND ENTRY T
O change":PRINT:PRINT"      UP-AR
ROW = SCROLL FORWARD":PRINT"
 DOWN-ARROW = SCROLL BACK":PRINT
"          C = CHANGE":PRINT"A
NY OTHER KEY = MAIN MENU":SOUND2
00,1:GOTO940
452 CLS:PRINT"change: ";MID$(T$(
X),1,L):PRINT:PRINT"1. CHANGE TI
TLE":PRINT"2. CHANGE TAPE NUMBER
":PRINT"3. CHANGE COUNTER NUMBER
":PRINT"4. WORK MENU":PRINT:PRIN
T"SELECT ONE":SOUND200,1
453 R$=INKEY$:IF R$="" THEN453
454 Q=VAL(R$):IF Q<1 OR Q>4 THEN
GOSUB1360:GOTO452
455 CLS:PRINT MID$(T$(X),1,L):PR
INT"   TAPE NUMBER: ";MID$(T$(X)
,L+1,3):PRINT"COUNTER NUMBER: ";
RIGHT$(T$(X),4):ON Q GOTO 456,45
7,459,340
456 PRINT:PRINT"ENTER NEW TITLE:
":SOUND200,1:INPUT R$:L$=RIGHT$(
T$(X),7):T$(X)=R$+L$:GOTO340
457 PRINT:PRINT"ENTER NEW TAPE N
UMBER (###):":SOUND200,1:INPUT R
$:IF LEN (R$)<>3 THENGOSUB1360:G
OTO455
458 L$=MID$(T$(X),1,L):Q$=RIGHT$
(T$(X),4):T$(X)=L$+R$+Q$:GOTO340
459 PRINT:PRINT"ENTER NEW COUNTE
R NUMBER (####):":SOUND200,1:INP
UT R$:IF LEN(R$)<>4 THENGOSUB136
0:GOTO455
```

NOVICES NICHE

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Graphics

Life in a Fish Bowl

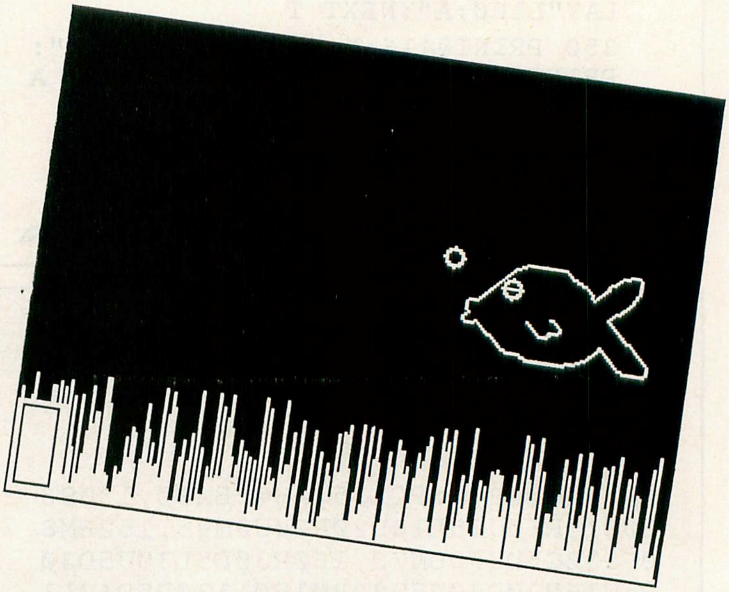
16K
ECB

By Sandy Tadman

Are you looking for a maintenance-free pet? Here's one for you — a blinking, bubble-burping fish. Not only do you not have to feed it, you can send it back to tape or disk whenever you're tired of it.

Electronic Aquarium is an exercise in simple animation using `PMODE4` and nested loops to achieve the appearance of motion. If, after typing in and running the program you find you aren't satisfied with your pet, you can customize him (or her) — after all, you have to live with it.

Try altering some of these variables. For example, the step rate of variable `M` (Line 15) controls the distance the fish moves; `R` determines where on the screen the fish, bubbles and eye are drawn; `X` controls the movement of the bubbles; and `E` controls the blinking of the eye. Alter the value `Z` in Line 22 to change how often the filter bubbles. Add color, if you own a CoCo 3. You can even change the shape of the fish as set in `F$` (Line 14).



The listing: `AQUARIUM`

```
4 '******************************
5 '*    ELECTRONIC  AQUARIUM    *
6 '*           by               *
7 '*       Sandy Tadman         *
8 '*     (C) JULY 1987          *
9 '******************************
10 PMODE 4:SCREEN 1,1:PCLS
11 R=160:E=R+24:E1=R+27
12 FORGR=1TO254:A=RND(50):LINE(G
R,190)-(GR,(140+A)),PSET:NEXTGR:
'weed
13 LINE(1,155)-(20,190),PSET,BF:
LINE(3,157)-(17,187),PRESET,B
14 F$="S7H1U2E1R2E8RERER9F2RFRFR
F2DFE3UERE2RRER2FD3GDGDG3LG2F5RF
5D2GL5HLH5DG3LGLGL2GL9HLHL3HLH3L
H3G1L2H1U1E1BR14F3R2EUR2EUH2L":'
fish
15 FOR M=168 TO 0 STEP-3
16 S$=STR$(M) + ",96"
17 DRAW"BM"+S$+"C1;XF$;":GOSUB 2
0
18 DRAW"BM"+S$+"C0;XF$;":NEXT M
19 GOTO 16
20 PLAY"T255L4B":FOR X=96 TO 0 S
TEP-20:CIRCLE(R,X),4:CIRCLE(E,85
),4,,.01:CIRCLE(E,85),4,0:
```

```
21 FORY=X+40TO 0STEP-20:CIRCLE(R
,Y),4,0:CIRCLE(E,85),4:NEXTY:'ey
e
22 Z=RND(30):IF Z>28 GOSUB26
23 NEXT X:R=R-3:E=E-3:E1=E1-3:IF
 R<=10 THEN END
24 CIRCLE(E1,85),4,0:CIRCLE(E1,8
5),4,0,.01
25 RETURN
26 FOR B=151 TO 0 STEP-10:CIRCLE
(5,B),5:NEXT B:'filter
27 PLAY"O1T250CDEFGABO2CDEFGABO3
CDEFG"
28 FORB=151 TO 0STEP-10:CIRCLE(5
,B),5,0:NEXT B
29 RETURN
```

Utilities

16K
ECB

A CoCo Pop-Up Calculator

By Frank Turner

A friend of mine is always extolling the virtues of his new Macintosh. I enjoy demonstrating that almost anything his high-priced computer can do, my CoCo can do, also. So, when I saw what a neat graphic calculator he had, I thought I would write a CoCo version for myself.

Calc draws a calculator on the screen and allows you to perform ordinary four-function mathematical operations (addition, subtraction, multiplication and division.) Just enter a number, an "operator" (+ , -, * , /), another number and the "equals" sign (=), and your answer will be displayed on the calculator screen.

Press C to clear the display for another operation. If you are finished, press the space bar, and the calculator will erase itself from the screen. As programmed, pressing the space bar also ends the program. But you can easily adapt *Calc* to become a subroutine of one of your larger programs with an `INPUT` or `INKEY` loop. In fact, the numbering of the program starts at Line 5000 to aid you in its transferal to a subroutine.

Just imagine — you're in the middle of a database program and need to do some calculations on your raw data. You won't have to waste time away from the keyboard hunting for your pocket calculator; you can quickly call up *Calc*, get your answer and return to the database where you left off!

Note: If you are using *Calc* as a subroutine, make sure that its variable names are not duplicated in the main program. Also, the `DIM` statement ought to go at the beginning of the main program.

The values required for the calculator display, or, in fact, any other display you may desire to construct, can be looked up in tables. In practice, it is easier to let the computer do the work. Just type in and run this one-line program:

```
1000 FORX=1TO128:PRINT@170,X:"=";:POKE1200,X
:FORY=1TO200:NEXTY:NEXTX
```

This mini-program lets you pick out the correct values to use to generate the character.

The listing: `CALC`

```
5000 REM************************
*
5001 REM* CALCULATOR SUBROUTINE
*
5002 REM************************
*
5003 DIMP(90):CF$="######.#"
5004 DATA129,131,131,131,131,131
,131,131,131,130,133,96,96,96,96
,96,96,96,96,138,132,140,140,140
,140,140,140,140,140,136,32,49,1
28,50,32,32,51,32,52,32
5005 DATA32,53,32,54,32,32,55,32
,56,32,32,57,32,48,32,32,32,32,6
1,32
5006 DATA32,43,32,45,32,32,47,32
,42,32
5007 DATA32,32,32,32,32,32,32,32
,32,32,3,1,12,3,21,12,1,20,15,18
5008 Y=992:A=0
5009 FORX=Y+208 TO Y+217:P(A)=PE
EK(X):READXX:POKEX,XX
5010 A=A+1:NEXTX
5011 Y=Y+32:IFY>1279 GOTO 5012 E
LSE GOTO5009
5012 Y=0:B$="":D$="":O$="":C$=""
5013 C$=INKEY$:IF C$=""THEN5013
5014 PRINT@209+Y,C$;:B$=B$+C$:Y=
Y+1
5015 IF C$="*" OR C$="/" OR C$="
+" OR C$="-" THEN PRINT@209,"
  "C$;:O$=C$:GOTO 5017
5016 GOTO5013
5017 Y=0
5018 C$=INKEY$:IFC$=""THEN5018
5019 PRINT@209+Y,C$;:D$=D$+C$:Y=
Y+1
5020 IF C$="=" AND O$="*" THEN A
=(VAL(B$))*(VAL(D$)):GOTO5025
5021 IF C$="=" AND O$="/" THEN A
=(VAL(B$))/(VAL(D$)):GOTO5025
5022 IF C$="=" AND O$="+" THEN A
=(VAL(B$))+(VAL(D$)):GOTO5025
5023 IF C$="=" AND O$="-" THEN A
=(VAL(B$))-(VAL(D$)):GOTO5025
5024 GOTO5018
5025 PRINT@209,USINGCF$;A;
5026 C$=INKEY$:IFC$=""THEN5026
5027 IFC$="C" THEN PRINT@209,"
      ";:GOTO 5012
5028 IFC$=CHR$(32) GOTO5030
5029 GOTO 5026
5030 Y=992:A=0
5031 FORX=Y+208 TO Y+217:POKEX,P
(A)
5032 A=A+1:NEXTX
5033 Y=Y+32:IFY>1279 THEN END EL
SE GOTO 5031
```

The ABCs of Organization

16K
Disk

By Andre Needham

This short program alphabetizes the directory entries on your disks, which makes keeping track of programs much easier.

To use *DIR Alpha*, just put the disk to be alphabetized in Drive 0 and run the program. That's all there is to it!

The listing: DIRALPHA

```
10 CLEAR1100:DIMD$(68):CLS:PRINT
"DIRECTORY ALPHABETIZER":PRINT
20 INPUT"PRESS ENTER TO START";A
$
30 PRINT"ONE MOMENT...":Z=0:FORT
=3 TO 11:A$="":B$="":DSKI$D,17,T
,A$,B$
40 FORQ=1 TO 97 STEP32:C$=MID$(A
$,Q,16):IFASC(LEFT$(C$,1))=255 T
HEN130
50 IFASC(LEFT$(C$,1))=0 THEN70
60 D$(Z)=C$:Z=Z+1
70 NEXT
80 FORQ=1 TO 97 STEP32:C$=MID$(B
$,Q,16):IFASC(LEFT$(C$,1))=255TH
EN130
90 IFASC(LEFT$(C$,1))=0 THEN110
100 D$(Z)=C$:Z=Z+1
110 NEXT
120 NEXT
130 Z=Z-1:IFZ=0THENPRINT"ONLY ON
E FILE ON DISK-NO NEED  TO ALPH
ABETIZE":END
140 FORT=0TOZ-1:FORS=T+1 TOZ
150 IFD$(S)<D$(T) THEN C$=D$(S):
D$(S)=D$(T):D$(T)=C$
160 NEXTS,T
170 N$=STRING$(16,0):FORT=0 TO Z
+3 STEP8:A$="":B$=""
180 FORU=0 TO 3:IFT+U<=Z THEN A$
=A$+D$(T+U)+N$ ELSE 230
190 NEXT:FORU=4 TO 7:IFT+U<=Z TH
EN B$=B$+D$(T+U)+N$ ELSE240
200 NEXT
210 DSKO$0,17,T/8+3,A$,B$:IFT+U<
=Z THENNEXT
220 IFT/8+4 <18 THENA$=STRING$(1
28,255):B$=A$:DSKO$0,17,T/8+4,A$
,B$
225 END
230 A$=A$+STRING$(128-LEN(A$),25
5)
240 B$=B$+STRING$(128-LEN(B$),25
5):GOTO210
```

Hard Copy Your Directory

16K
Disk

By Jim Knoppow

If you're as tired as I am of rooting through a pile of disks in order to find a particular file, here comes some rapid relief.

Pop a roll of 3½-by-15/16 inch labels into your Epson-compatible printer, run *DIR Print*, and — *voila!* — out comes a neatly printed label showing every entry in the directory. Each label will hold up to 36 names and extensions.

In my filing system, I place my disks into categories (e.g., graphics, games, utilities, word processing text files, etc.). When a disk is reasonably full, it goes into a permanent filing system, a backup is made, and two *DIR Print* labels are printed — one for the main disks and one for the backup.

I also like to run *DIR Print* using ordinary computer paper (instead of labels) so that I can have an index of all my programs on one page.

All the printer codes are commented in the listing; so, if your printer is not Epson-compatible, you should be able to substitute the correct codes. Incidentally, until you reset the CoCo, directories will be printed to the screen in two columns for easier reading.

On some printers, the code in Line 40 that selects condensed type may be canceled by the code in Line 50, which selects elite type. You may need to put a REM marker at the beginning of Line 50. On my Epson LX 86 printer, the four columns of directory information fit on the label with plenty of room. On other printers, such as the Epson FX, however, the condensed mode is larger, and fitting the columns on a standard label is a tight squeeze, requiring a few trial runs. If you have problems, please feel free to contact me at 15355 SE 307 St., Kent, WA 98042.

```
ACCOUNT  BAS    ANIMATE  BAS    AUTODIAL BAS    BARREL   BAS
BEEZAP   BAS    BIOCHART BAS    BLASTER  BAS    COCODRAW BAS
COCOKEYS BAS    DESKTOPL BAS    DIRALPHA BAS    DIRPRINT BAS
ENVELOPE BAS    F15EAGLE BAS    FIFTHDIM BAS    FOOTBALL BAS
FORMATTR BAS    GRAPH    BAS    HANGMAN  BAS    JETPLANE BAS
LE LUTIN BAS    MAPSCALE BAS    METRNOME BAS    MONEYJAR BAS
PAYROLL  BAS    RESCUE   BAS    ROADSKIL BAS    ROBOFLIP BAS
SCRNDMP  BAS    SPELDOWN BAS    TAXINFO  BAS    USETOWN  BAS
VACATION BAS    VARIABLE BAS    WDSEARCH BAS    YARDSALE BAS
```

Editor's Note: For best results, use DIR Print *and* DIR Alpha, *the preceding program, in tandem — you will be able to locate any file in a matter of seconds.*

The listing: DIRPRINT

```
10 POKE150,1 'SETS BAUD RATE TO
9600-TO CHANGE THIS COCO TO
PRINTER COMMUNICATION SPEED SEE
YOUR COCO MANUAL.
20 PRINT#-2,CHR$(27);CHR$(51);CH
R$(18)'LINE SPACING (1/12")
30 PRINT#-2,CHR$(27);CHR$(83);CH
R$(0)'SELECT SUPERSCRIPT
40 PRINT#-2,CHR$(27);CHR$(15)'SE
LECT CONDENSED
50 PRINT#-2,CHR$(27);CHR$(77)'SE
LECT ELITE
60 FORX=3072TO3134:READA$:POKEX,
VAL("&H"+A$):NEXT
70 DATA 1A,50,8E,80,00
80 DATA A6,84,B7,FF,DF
90 DATA A7,80,8C,E0,00
100 DATA 27,05,B7,FF,DE
110 DATA 20,EF,1C,AF,86
120 DATA 12,B7,CC,EC,B7
130 DATA CC,ED,B7,CC,EE
```

```
140 DATA B7,CD,00,B7,CD
150 DATA 01,B7,CD,02,B7
160 DATA CD,03,B7,CD,04
170 DATA B7,CD,05,B7,CD
180 DATA 18,B7,CD,19,B7
190 DATA CD,1A,39
200 EXEC3072
210 PRINT#-2,CHR$(27);CHR$(81);C
HR$(64)'SELECT 64 CHAR/LINE
220 CLS
230 POKE 111,0
240 PRINT"INSERT DISK WHOSE DIRE
CTORY YOU WISH TO PRINT"
250 PRINT:PRINT"POSITION LABEL I
N PRINTER"
260 PRINT:INPUT"HIT <ENTER> TO P
RINT";Z
270 CLS
280 POKE111,254:DIR
290 PRINT#-2,CHR$(13)'CARRIAGE R
ETURN
300 INPUT" DO YOU WANT TO PRINT
ANOTHER,    <YES OR NO>";A$
310 B$=LEFT$(A$,1)
320 IF B$="N"THENEND
330 IF B$="Y"THEN220
340 GOTO300
```

Reading Word Processing Files

4K

By Chris Steele

This program allows you to read a text file without having to load a word processor. After running, enter the filename with its proper extension. *ASCII Read* asks if you want the file output to the screen or to the printer, giving you a selection of printer baud rates to choose from. Note: If the file contains embedded control codes, the program might not work.

The listing: ASCIREAD

```
5 '* THE ASCII SCREEN MACHINE *
6 '* ASCIREAD BY CHRIS STEELE *
10 CLS:PRINTSTRING$(32,140);:PRI
NT" The Ascii Print Utility (c)8
7":PRINTSTRING$(32,140);:PRINT"P
rog Created by: Chris Steele"
15 PRINT:LINEINPUT"[ENTER] textn
ame/EXT:";FILE$:IFFILE$=""THEN15
ELSEPRINT:PRINT"Would you like t
o output file:":PRINT"[1] SCREEN
    [2] PRINTER":LINEINPUT"Enter
Choice:";CH$:IFCH$="1"THEN20 ELS
E IFCH$="2"THEN45
20 OPEN"I",#1,FILE$
21 CLS:PRINT"[Press <S> to stop
scrolling]":FORX=1TO500:NEXTX
25 ST=0
30 ST=ST+1:IFST>60THEN40
35 IFINKEY$="S"ORINKEY$="s"THEN4
0ELSEIFNOTEOF(1)THENLINEINPUT#1,
TEXT$:PRINTTEXT$:GOTO35 ELSE CLO
SE:FORX=1TO500:NEXTX:PRINT"[End
of file]":GOTO10
40 PRINT:LINEINPUT"[<S>top or <C
>ontinue]:";C$:IFC$="S"ORC$="s"T
HENCLOSE#1:PRINT"* aborted *":GO
TO10ELSE25
45 PRINT:PRINT"Following Baud Ra
te to choose:":PRINT"[1] 300 BAU
D   [2] 600 BAUD":PRINT"[3] 1200
 BAUD  [4] 2400 BAUD":PRINT"[5]
4800 BAUD  [6] 9600 BAUD":PRINT:
INPUT"Enter Baud#";BD$:IFBD$=""T
HEN45
50 IFBD$="1"THENPOKE150,180:GOTO
90
55 IFBD$="2"THENPOKE150,87:GOTO9
0
60 IFBD$="3"THENPOKE150,41:GOTO9
0
65 IFBD$="4"THENPOKE150,18:GOTO9
0
70 IFBD$="5"THENPOKE150,7:GOTO90
75 IFBD$="6"THENPOKE150,1:GOTO90
80 GOTO45
90 IFPEEK(&HFF22)<>4THENPRINT:PR
INT"Printer is not ready,turn it
 on":PRINT:LINEINPUT"Press [ENTE
R] when ready:";ZZ$:IFZZ$=""THEN
94ELSE90
94 OPEN"I",#1,FILE$
95 IFNOTEOF(1)THENLINEINPUT#1,TE
XT$:PRINT#-2,TEXT$:GOTO95 ELSE C
LOSE#1:PRINT:PRINT"[Printing is
complete]":FORX=1TO500:NEXTX:GOT
O5
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

For greater convenience, your high scores may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`.

★ Current Record Holder ● Shutout

ADVANCED STAR*TRENCH (THE RAINBOW, 7/86)

4,300	★Jeffrey Warren, Waynesville, NC
3,975	David Schaller, Clarkston, WA
3,960	Maurice MacGarvey, Dawson Creek, British Columbia
3,960	Robbi Smith, Helena, HI
3,800	Shaw Muniz, Los Angeles, CA
2,600	John Fredericks, Kalkaska, MI
2,450	Blain Jamieson, Kingston, Ontario

BEE ZAPPER (THE RAINBOW, 9/87)

9,650	★Benoit Landry, Drummondville, Quebec

BOUNCING BOULDERS *(Diecom)*

9,318	★Skip Taday, East Lyme, CT
8,859	Darrell Gilpin, Norwalk, CA
7,448	Philip Manwarren, Harrington, ME
3,994	Louis Bouchard, Gatineau, Quebec
1,561	Lise Nantel, L'Acadie, Quebec

BREWMASTER *(NOVASOFT)*

133,575	★Melody Webb, Lakeport, CA
126,925	Matthew Leitman, Beaconsfield, Quebec

BUBBLE WARS (THE RAINBOW, 2/86)

52,100	★Daniel Cecil, Bardstown, KY
42,800	Blain Jamieson, Kingston, Ontario
41,400	Becky Rumpel, Arcadia, WI
26,350	Jason Ebbeling, Berkshire, MA

BUZZARD BAIT *(Tom Mix)*

22,931,850	★Skip Taday, East Lyme, CT
763,550	Geran Stalker, Rivordalo, GA

CALIXTO ISLAND *(Mark Data)*

196	★Augusto Voysest, Lima, Peru

CANYON CLIMBER *(Radio Shack)*

1,627,500	★Matthew Fumich, Munford, TN
178,200	Darren King, Yorkton, Saskatchewan
169,000	Gregory Speer, Emporia, KS
159,200	Upton Thomas, Arnold, MD
150,200	Brian Lewis, Baltimore, MD
141,400	Michael Petry, Kansas, AL
135,600	Eric Rose, Grand Coulee, WA
128,000	Tony Bacon, Mt. Vernon, IN
125,600	Tim Lang, Downieville, CA
125,000	Tony Fortino, Tacoma, WA

CASTLE (THE RAINBOW, 6/86)

326,352	★Richard Donnell, Penns Grove, NJ
228,622	John Broussard Jr., Alexandria, LA
202,659	Brendan Powell, La Grande, OR
116,606	Darryn Bearisto, New Carlisle, Quebec
93,672	Maurice MacGarvey, Dawson Creek, British Columbia

CLOWNS & BALLOONS *(Radio Shack)*

688,960	★Faye Keefer, Augusta, GA
70,180	Charles Andrews, Delta Jct, AK
36,650	Melody Webb, Lakeport, CA

COLOR POKER (The Rainbow, 4/83)

4,128,600	★Earl Foster, Lynchburg, VA

CRYSTLE CASTLES *(ThunderVision)*

554,979	★Patrick Martel, Laval, Quebec
60,107	Alphonse Brown, Houston, TX

DALLAS QUEST *(Radio Shack)*

81	★Brad Wilson, Lithia Springs, GA
85	David and Shirley Johnson, Leicester, NC
86	Roy Grant, Toledo, OH
86	Melanie Moor, Florence, AL
86	Paul Summers, Orange Park, FL
87	Douglas Bell, Duncan, OK
89	Chris Piche, White Rock, British Columbia
89	Milan Parekh, Fullerton, CA
89	Andrew Urquhart, Metairie, LA
89	Steve Zemaitis, Howell, MI
91	John Semonin, Akron, OH

DECATHALON *(Spectral Associates)*

7,216	★Martin Parada, Arcadia, CA

DEF MOV (THE RAINBOW, 1/87)

30,253	★Benoit Landry, Drummondville, Quebec

DEMON ATTACK *(Imagic)*

72,410	★Glenn Hodgson, Aberdeenshire, Scotland
40,435	Upton Thomas, Arnold, MD
28,780	Daniel Streidt, Cairo, Egypt
4,960	Laundre Clemon, Sacramento, CA

DESERT RIDER *(Radio Shack)*

50,797	★Patrick Devitt, Lombard, IL
26,125	Ryan Grady, Newbury Park, CA

DEVIL ASSAULT *(Tom Mix)*

1,866,100	★Stephane Martel, Laval, Quebec
623,550	Dale Krueger, Maple Ridge, British Columbia
75,000	Blake Cadmus, Reading, PA

DOWNLAND *(Radio Shack)*

99,980	★Danny Wimett, Rome, NY
98,985	Karl Gulliford, Summerville, SC
97,740	Stephane Deshaies, Beloeil, Quebec
89,490	Neil Edge, Williston, FL
77,254	Tom Audas, Fremont, CA
73,346	Jean-Francois Morin, Loretteville, Quebec
70,142	Chris Goodman, Baltimore, MD
68,142	Cooper Valentin, Vavenby, British Columbia
67,721	Keith Yampanis, Jaffrey, NH
62,442	Eddie Lawrence, Pasadena, Newfoundland
55,300	Patrico Gonzalez, Buenos Aires, Argentina
49,500	Danny Perkins, Clifton Forge, VA
43,502	Mike Ells, Charlotte, MI
41,896	Antonio Hidalgo, San Jose, Costa Rica
40,360	Jesse Binns, Phoenix, AZ
34,424	Andrea Mayfield, Melbourne, FL
25,147	Timothy O'Neal, Commerce, TX
21,527	Scott Godfrey, Nashua, NH
19,835	Christopher Heston, Louisville, KY
18,251	Sam DiCerce, Willowich, OH
18,103	Sarah Van Oteghem, Taylor Ridge, IL
17,120	Kay McCluskey, Remsen, NY

DRAGON BLADE *(Prickly-Pear)*

69	★Jason Damron, Folsom, CA

DRAGON FIRE *(Radio Shack)*

146,325	★Stephane Martel, Laval, Quebec
5,561	Chris Lorenz, Kiester, MN

ESCAPE 2012 *(Computerware)*

202	★Roy Grant, Toledo, OH

FIRE COPTER *(Adventure International)*

126,420	★Brad Wilson, Lithia Springs, GA
64,710	Phillip Gregory, Moultrie, GA

FIRESTORM (THE RAINBOW, 1/86)

22,505	★Chad Presley, Luseland, Saskatchewan
8,910	Stephane Martel, Laval, Quebec
5,680	Kathy Rumpel, Arcadia, WI
3,760	Rick Beevers, Bloomfield, MN
3,505	Blake Cadmus, Reading, PA

GALACTIC ATTACK *(Radio Shack)*

26,370	★Jeff Remick, Warren, MI
9,930	Daniel Streidt, Cairo, Egypt

GALAGON *(Spectral Associates)*

328,820	★Bernard Burke, Lee's Summit, MO
255,080	Jason Clough, Houston, TX
249,960	Matthew Fumich, Munford, TN
169,410	Danny Dunne, Pittsfield, NH
149,520	Vernon Johnson III, Parkville, MD
116,280	Scott Jamison, Billerica, MA
116,000	Micah Clough, Houston, TX

GALAX ATTACK *(Spectral Associates)*

236,350	★Corey Leopold, Nada, TX
28,300	Augusto Voysest, Lima, Peru

GALLOPING GAMBLERS (THE RAINBOW, 12/85)

3,427,660	★Sean Lair, Ewing, MO

GANTELET *(Diecom Products)*

23,643,720	★Geran Stalker, Rivordalo, GA
20,921,490	Randall Edwards, Dunlap, KS
10,222,940	Clinton Morell, Sacramento, CA
10,020,500	Ken Hubbard, Madison, WI
7,493,340	Stirling Dell, Dundalk, Ontario
2,626,950	Jonathon Ross, Pocomoke City, MD
2,512,620	Jason Steele, Pensacola, FL
2,312,640	Rory Kostman, Hershey, NE
2,115,790	Jerry Honigman, Waggoner, IL
2,011,200	Jerry Colbert, Bakersfield, CA
1,224,190	Jonathan Wanagel, Freeville, NY
1,108,750	Robert Fox, Dover, OH
1,094,280	Donnie Pearson, Arvada, CO
1,081,530	Michael Wallace, Bronx, NY
1,025,900	John Hotaling, Duanesburg, NY
1,016,050	Edward Swatek, Chicago, IL
933,740	Yvan Langlois, Laval, Quebec
932,660	Brian Hunter, South Berwick, ME
787,780	Brad Wilson, Lithia Springs, GA
685,840	Karen Jessen, Cleveland, OH
667,390	Robbie Smith, Helena, HI
456,220	Scott Jamison, Billerica, MA
410,868	Billy Helmick, Independence, KY
79,570	David Gordon, Pierre, SD

GHANA BWANA *(Radio Shack)*

523,080	★Joseph Delaney, Augusta, GA
457,520	Georgina Haynes, Nice, CA
252,840	Edward Rocha, Cobleskill, NY

GRABBER *(Tom Mix)*

432,650	★Matthew Fumich, Munford, TN

HALL OF THE KING *(Prickly-Pear)*

107	★Joshua Wanagel, Freeville, NY

HITCHHIKER'S GUIDE TO THE GALAXY *(Infocom)*

400/510	★Brad Wilson, Lithia Springs, GA

HOME ROW BOMBER (THE RAINBOW, 1/87)

6,384	★Timothy Hennon, Highland, IN

SCOREBOARD

3,372 Benoit Landry, Drummondville, Quebec

INFIDEL *(Infocom)*
400/326 ★Brad Wilson, Lithia Springs, GA

JOKER POKER (THE RAINBOW, 3/87)
2,793,285 ★Blain Jamieson, Kingston, Ontario
13,377 Jason Ebbeling, Berkshire, MA
11,000 Frankie DiGiovanni, Olney, MD

JUNIOR'S REVENGE *(Computerware)*
2,503,000 ★Stephane Martel, Laval, Quebec
257,600 Keith Cohen, Rocky Mount, NC

THE JUNGLE (THE RAINBOW, 8/84)
432,223 ★Michael Nystrom, West Bridgewater, MA

JUNKFOOD (THE RAINBOW, 11/84)
18,650 ★Daniel Streidt, Cairo, Egypt

KARATE *(Diecom Products)*
11,600 ★Jonathon Ross, Pocomoke City, MD
6,300 David Darling, Longlac, Ontario

THE KING *(Tom Mix)*
3,824,280 ★Andre Grenier, Quebec, Canada
22,400 Spencer Metcalf, Longview, TX

KORONIS RIFT *(Epyx)*
186,710 ★Tony Harbin, Cullman, AL
184,180 Russell Johnson, Sarnia, Ontario
184,120 John Farrar, Lebanon, TN
133,990 Paul Blessing, Spring, TX
84,830 Thomas Beruheimer, Yoru, PA
84,070 David Spalding, Galena Park, TX
33,900 Steven Moreno, Stockton, CA
13,210 David Ewing, Deatsville, AL

LUNAR RESCUE (THE RAINBOW 8/87)
113,579 ★Jeff Remick, Warren, MI

LUNCHTIME *(Novasoft)*
444,325 ★Richard Donnell, Penns Grove, NJ
136,925 Alphonse Brown, Houston, TX
103,350 George Ramos, Lakeport, CA
55,550 Richard Deane, Chicago, IL
42,025 Steve Place, Webster, NY

THE MARTIAN CRYPT *(NOVASOFT)*
32 ★Matthew Fumich, Munford, TN

MEGA-BUG *(Radio Shack)*
5,172 ★Jason Ebbeling, Berkshire, MA

MISSION: F-16 ASSAULT *(Diecom Products)*
468,750 ★Karen Jessen, Cleveland, OH
355,570 Stirling Dell, Dundalk, Ontario
318,160 Jeremy Pruski, Sandwich, IL
137,920 Mike Grant, Fresno, CA
127,550 Michael Heitz, Chicago, IL
120,670 Vernon Johnson III, Parkville, MD
58,530 Chris Wright, New Albany, IN

MOON HOPPER *(Computerware)*
103,840 ★Alphonse Brown, Houston, TX
100,990 George Ramos, Lakeport, CA
51,870 Martin Kertz, Forrest City, AR

MUNCHKIN BLASTER (THE RAINBOW, 8/87)
9,000 ★Benoit Landry, Drummondville, Quebec
7,240 Jeff Remick, Warren, MI

ONE-ON-ONE *(Radio Shack)*
1,276-0 ★●Jonathan Dorris, Indianapolis, IN
1,210-0 ●Gregg Thompson, Chesterfield, VA
1,204-0 ●Chad Johnson, Benton, AR
1,160-0 ●Mark Lang, Downieville, CA
1,132-23 Dan Liffmann, Andover, MA
1,122-4 Jason Ebbeling, Berkshire, MA

PAPER ROUTE *(Diecom Products)*
1,120,350 ★Neil Haupt, Elyria, OH
1,059,350 David Kauffman, South Haven, MI
830,950 Christopher Darden, Woodson Terrace, MO
720,560 Konnie Siewierski, Schaumburg, IL
531,600 Larry Shelton, Marion, IL
25,700 Patrick Devitt, Lombard, IL

PEGASUS AND THE PHANTOM RIDERS *(Radio Shack)*
303,100 ★Mike Grant, Fresno, CA
244,100 Martinez Domingo, Miami, FL
67,100 Ryan Grady, Newbury Park, CA

PINBALL *(Radio Shack)*
399,350 ★Troy Stoll, Washington, IN
213,300 Patrick Martel, Laval, Quebec
142,400 Thomas Payton, Anderson, SC

PITFALL II *(Activision)*
199,000 ★Sean Noonan, Green Bay, WI
121,680 Robert Wells, Topeka, KS

PITSTOP II *(Epyx)*
54 ★Rusty Breitbach, Rickardsville, IA
54 ★Jeff Coburn, Easton, PA
54 ★Walter Hearne, Pensacola, FL
54 ★Jeff Szczerba, Sturtevant, WI
54 ★Sean Noonan, Green Bay, WI
54 ★Brad Wilson, Lithia Springs, GA
51 Christian Grenier, Valleyfield, Quebec
49 Randy Venable, Coal City, WV
9 Laundre Clemon, Sacramento, CA

PLANETFALL *(Infocom)*
400/210 ★Brad Wilson, Lithia Springs, GA

POPCORN *(Radio Shack)*
94,470 ★Patrick Martel, Laval, Quebec
25,850 Matthew Leitman, Beaconsfield, Quebec

PYRAMID *(Radio Shack)*
220 ★Jason Ebbeling, Berkshire, MA

PYRAMID 2000 *(Radio Shack)*
100 ★Peter Antonacopoulos, Toa Baja, Puerto Rico

QUIX *(Tom Mix)*
8,407,772 ★John Haldane, Tempe, AZ
1,404,000 Curtis Goodson, Sao Paulo, Brazil
1,003,104 Elisa Goodson, Sao Paulo, Brazil
326,192 Martin Parada, Arcadia, CA
205,335 John Hotaling, Duanesburg, NY
104,034 Christopher Conley, North Attleboro, MA

RESCUE ON FRACTALUS *(Epyx)*
270,000 ★Russell Johnson, Sarnia, Ontario
99,967 Gary Sebastian, Hazel Park, MI
88,445 James Andrews, Kissimmee, FL
48,445 Steven Moreno, Stockton, CA

RETURN OF JUNIOR'S REVENGE *(Colorware)*
1,792,800 ★Chad Presley, Luseland, Saskatchewan

RETURN OF THE JET-I *(ThunderVision)*
309,250 ★Melody Webb, Lakeport, CA

ROGUE *(Epyx)*
27,542 ★Melanie Lapoint, Fitchburg, MA
21,682 Paul Blessing, Spring, TX
17,851 Yvan Langlois, Laval, Quebec
8,812 Allen Houk, San Diego, CA
6,576 Kirk Marshall, Westport, MA
6,204 Scot Drew, Ottawa, OH
5,679 David Spalding, Galena Park, TX
5,369 John Moore, Ottawa, OH
5,274 Reland Brumfield, LaJolla, CA
4,719 Mary Calcott, LaJolla, CA

SAILOR MAN *(Tom Mix)*
332,600 ★Jeremy Carter, Spring Lake Park, MN
287,200 Patrick Devitt, Lombard, IL

SANDS OF EGYPT *(Radio Shack)*
82 ★Edward Rocha, Cobleskill, NY
86 Roy Grant, Toledo, OH
87 Neil Haupt, Elyria, OH

SAUCER DEFENSE (THE RAINBOW, 4/87)
30,900 ★Jason Ebbeling, Berkshire, MA

SHOOT'N RANGE (THE RAINBOW, 8/87)
5,433 ★Benoit Landry, Drummondville, Quebec

SHORT-TERM MEMORY TEST (THE RAINBOW, 12/85)
20 ★Brian and Harold Matherne, Gretna, LA

SPEEDSTER (THE RAINBOW 8/87)
4,710 ★Andrea Reelitz, Greenville, IL
3,350 Jamie Stoner, Mt. Union, PA

STELLAR LIFE-LINE *(Radio Shack)*
629,000 ★Steven Smith, Matthews, NC
114,620 Martinez Domingo, Miami, FL

SUCCESS MANSION (THE RAINBOW, 1/87)
13/13 ★Dave Allessi, Iselin, NJ

SUPER ROOTER (THE RAINBOW, 5/86)
15,180 ★Richard Donnell, Penns Grove, NJ
11,090 Frederick Lajoie, Nova Scotia, Canada
3,910 Daniel Bradford, Birmingham, AL

TEMPLE OF ROM *(Radio Shack)*
303,600 ★Tim Hennon, Highland, IN

TREKBOER *(Mark Data)*
132 ★Matthew Fumich, Munford, TN
123 Roy Grant, Toledo, OH

TUT'S TUMB *(Mark Data)*
118,720 ★Reina Roy, Carleton, Quebec
74,780 Mack Haynes, Nice, CA
72,000 Chad Presley, Luseland, Saskatchewan
60,020 Don Siler, Muncie, IN
45,000 Blake Cadmus, Reading, PA

VARLOC *(Radio Shack)*
2,032 ★Tony Harbin, Cullman, AL
2,032 ★Edward Rocha, Cobleskill, NY
2,008 Philip Puffinburger, Winchester, VA
1,995 Denise Rowan, Minneapolis, MN
1,991 Ryan Grady, Newbury Park, CA
1,988 Randall Edwards, Dunlap, KS
1,975 Bernard Florence, Croydon, Australia

VICIOUS VIC (THE RAINBOW, 7/86)
18,813 ★Talib Khan, Bronx, NY
11,902 Martha James, Swarthmore, PA
10,489 Karl Gulliford, Summerville, SC
6,294 Pat O'Neill, Nepean, Ontario
4,643 Martha James, Swarthmore, PA
3,285 Richard Donnell, Penns Grove, NJ

THE VORTEX FACTOR *(Mark Data)*
100/276 ★Tommy Crouser, Dunbar, WV
100/483 Rick & Brenda Stump, Laureldale, PA
210 Paul Maxwell, Vancouver, British Columbia

WARP FACTOR X *(Prickly-Pear)*
5,829,559 ★Doug Lute, Clymer, PA

WISHBRINGER *(Infocom)*
400/201 ★Brad Wilson, Lithia Springs, GA

WRESTLE MANIAC *(Diecom)*
956,971 ★Marc Reiter, Cincinnati, OH
546,315 Louis Bouchard, Gatineau, Quebec
45,483 Tony Bacon, Mt. Vernon, IN
39,086 Billy Helmick, Independence, KY
26,599 Jonathon Ross, Pocomoke City, MD

ZAKSUND *(Elite Software)*
357,550 ★Martin Parada, Arcadia, CA
39,950 Walter Hearne, Pensacola, FL

ZAXXON *(Datasoft)*
2,061,000 ★Byron Alford, Raytown, MO
1,950,000 Blake Cadmus, Reading, PA
1,300,500 Dan Brown, Pittsford, NY
1,100,600 Andrew Urquhart, Metairie, LA
253,400 Bob Dewitt, Blue Island, IL
170,600 Matthew Yarrows, East Hampton, MA
163,700 Daniel Bradford, Birmingham, AL
119,600 Daniel Streidt, Cairo, Egypt
118,100 Upton Thomas, Arnold, MD
111,400 Jeff Miller, Bronson, MI
87,200 Tim Lang, Downieville, CA
83,700 David Darling, Longlac, Ontario
81,000 David Anderson, Midlothian, VA

ZONX (THE RAINBOW, 10/85)
6,500 ★Daniel Streidt, Cairo, Egypt

ZORK I *(Infocom)*
400/720 ★Brad Wilson, Lithia Springs, GA

ZUES *(Aardvark)*
3,380 ★Martin Kertz, Forrest City, AR

— **Jody Doyle**

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

Feedback

In response to questions from:

- Tim Collett: In *Raaku-Tu*, when you get to the south end of a great hallway, go north and you will be at the north end of the hallway. Once you get there you will need to go east to find the lamp. Next, you will need to go west back to the north end of the hallway, and go west again to find the candle. Then you will need to go to the petite chamber and light the candle with the lamp, and attack the gargoyle with the candle and then put it out.

A word of warning: If you get to the room with the vault and pull the lever, you will be killed.

Bryan Tucker
Pine Bluff, AR

- Jared Brookes: Don't use any rings until you have accomplished killing all the creatures on levels 1 through 3 in *Dungeons of Daggorath*.

- John Barsh: I shall make you a deal. I will tell you where the torch is if you tell me where the grapes and the scepter are in *Sands of Egypt*. The torch is two steps south of the cliff, then dig.

- Steven Kaschimer: Get away from all Abye flasks in *Dungeons of Daggorath*. They will kill you if you use them. Save all your Hale and Thews flasks.

- Jason Jasmin: In *Sands of Egypt*, I don't know where the dates are, but the pool I do know. When you are at the cliff, go down, then go west three times, then south and then east.

Eric Reitz
Mendham, NJ

- Richard Deane: To get past the tunnel in *Dragon's Blade*, go into the east room and get a boulder, then come back out. Type `THROW BOULDER` and when it asks where, type `N`. Now you can go safely through the tunnel (only if you have the sword from the mine!).

- Robert Taylor: To get the flashlight in *Dallas Quest*, try pulling the curtain.

- Fallon Yager: As far as I know, you do not go across the rug in *Raaku-Tu*. You can solve the game without going to that door.

To kill the wizard's image in *Dungeons of Daggorath*, make sure you have a Hale flask in one hand and either of the two rings in the other. Hit once with the Fire ring, drink a Hale flask, hit with the Ice ring, Hale flask, etc. It takes four shots to kill him.

- Rick Kelton: To find the amulet in *Trekboer*, look around where you found the Roman numerals . . . especially up.

- Chris Casey: To get out of the dark in *Hitchhiker's Guide to the Galaxy*, wait until it does not list one of the five senses, then use that sense. This works for all the darks.

In *Hitchhiker's Guide to the Galaxy*, how do you get the real tea or common sense?

How do you stop the boat from leaking in *Blackbeard's Island*?

Tom Lawrence
Middlesex, NJ

Scoreboard:

In *Dungeons of Daggorath*, what is the incantation for the Supreme ring?

David Wurmstein
Del Rio, TX

Scoreboard:

In *Dungeons of Daggorath*, to reveal a ring you may want to look the word up in a dictionary and the definition will give you a clue.

D.J. Massa
Linton, IN

Scoreboard:

I've finally become almost invincible on the first level of *Dungeons of Daggorath*, but when I climb to the next level, the ogre fellow of the giant knight's kills me. On Level 1, I get a lot of things hoarded around the ladder, such as a shield, wooden sword and a bundle of torches. Once, I got a ring and an iron sword, but I can't get them anymore. What do I do now?

Mike Snyder
Allen, OK

Scoreboard:

In *Dallas Quest*, to get the shovel, first drop the owl. Before you go down the ladder, put everything you have (except the flashlight) into the knapsack. Drop the knapsack, turn and go down the ladder with only your flashlight, then drop the flashlight and return to the trading post. Now get the knapsack and go down the ladder.

In *Sands of Egypt*, the torch is buried in the sand. To ride the camel you must first go to the tree and get the dates. Feed the camel the dates and ride the camel. The scepter is hidden in the carving and the ax is on top of the pyramid. You cannot get the rope; you must make your own by getting the palm fronds from the tree and braiding them.

When you are in the treasure room, type `GO CRACK`. Get back on your boat and float back until you are under the hole. Drop and climb the ladder.

Warning: Never drink the water that is underground.

Philip Manwarren
Harrington, ME

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

— Jody Doyle

Bring the CoCo 3's palette to PMODE 3 and 4 graphics

The Color Gallery

By Eric White

Just as the autumn leaves were beginning to introduce new colors to nature's palette, Tandy was introducing the CoCo 3 to the world of computer enthusiasts. With its new color abilities, the CoCo is now a real *color* computer. We now have the creative power of choice.

When we select the palette for our graphics, we can actually use color theory techniques such as analogous, monochromatic, secondary and tertiary color schemes. Imagine, purple mountains surrounded above by light, airy blue sky, a valley of golden flowers, and maybe a blackbird flying above.

All this and more! The CoCo 3 is a new beginning, but what happens to the old pictures we created on the previous CoCos? Are they stuck with the old palette of colors? No, *Color Change* will help you fix them.

Color Change allows you to load old *Graphicom* or *CoCo Max* pictures and change their color palettes. The program's menu is controlled with the four arrow keys and the space bar. You'll need a backup disk of Hi-Res (Oh, excuse me, they now call it "Lo-Res") `PMODE 3` or `PMODE 4` pictures. The pictures will not be harmed, and they will be saved as a standard 6K binary file, to remain compatible with most commercial software.

Load a picture by selecting the Load option. Once the picture is loaded, select either the upper or lower screen, which will be the picture screen saved back to the disk as a 6K binary file (addresses &H0E00, &H25FF and &H0006).

Make changes to the palette by moving the "change" bar over the colored square you want to modify and press the space bar. The picture will appear; to change the color, press the up or down arrow keys. When finished, press the space bar to accept the color change or press the `BREAK` key to abort the change. To see the picture at any time, press the `F1` key.

When finished with your palette changes, select the Save option to save the currently selected picture area (upper/lower), and the new palette will be coded and stored in the last part of the file's directory entry (bytes 16 through 31). Once you have colorized all your pictures, you will be ready to run the *Color Gallery* program, which displays the "colorized" standard Lo-Res `PMODE 3`/`PMODE 4` pictures on the CoCo 3 in a "gallery."

To use *Color Gallery*, type in the program and save it to a picture disk (disk containing Lo-Res pictures colorized with *Color Changer*), and then run.

The program loads and searches the disk directory for any file with the extension that matches the variable `FE$` in Line 100. Next, it will load and display each picture in the palette that is stored on the file's directory entry. If the picture file has no palette or if the computer being used is not a CoCo 3, the default palette of "black/red/blue/white" will be used.

Each picture remains on the screen for a few seconds; the time is controlled by variable `TM` in Line 110. To go to the next picture without waiting, just press the space bar and the program will continue.

Color Gallery can be put on almost any disk of pictures, since it loads the disk directory each time it is loaded and run. Just be sure the extensions of the pictures match the gallery extension variable.

Pal Print is a utility program used to decode and print the palettes of Lo-Res pictures. The output can be directed to the screen or printer. Enter the filename of the picture you want to decode, or press `ENTER` to decode all the pictures on the disk.

Sitting in front of the CoCo screen is a far cry from walking down the marble hallway of a New York art gallery, yet we can capture some of that awe and appreciation as we view the colorful pictures created by family and friends. Our computer galleries house the artistic creativity enhanced by this electronic age. Color, shape and texture are all there for the artist to control and mold into his own world of expression.

(Questions or comments about these programs may be directed to the author at P.O. Box 609, Altamonte Springs, FL 32715. Please enclose an SASE when writing for a reply.) □

Eric White is a self-taught programmer with a graphic arts background, who has been writing software for five years. He lives in Altamonte Springs, Florida, and has coauthored many programs in association with WHITESMITH.

310	42
1400	106
2900	44
4060	126
5600	7
7500	163
8500	42
9400	11
END	224

Listing 1: CHANGER

```
10 '****************************
20 '*       LOW-RES PICTURE    *
30 '*   PALETTE COLOR CHANGER  *
40 '* VERSION: 1.0     8610.31 *
50 '****************************
60 '*  (C) 1986 BY ERIC WHITE  *
70 '****************************
100 CLEAR2000,31231:PMODE3:PCLEA
R8:DIM CP(15),P$(72),A$(1),SP(24
):P=3:SC=0:OP=7
150 G$="/,5>?%* ?=:/-*OLEJOANMBO
LKENLHOL/ 5:?%* ?5:/-"+CHR$(34)+
"O@ENOEKGJO@OEJMJOL,,4<<$,(<<8,$
(LLDHLDHDHL@LDLLHLL"
160 FORX=1TO96:MID$(G$,X,1)=CHR$
(ASC(MID$(G$,X,1))+112):NEXT
200 FORZ=0TO15:READ CP(Z),A$:PAL
ETTE Z,CP(Z):NEXTZ
250 ON BRK GOTO 1100
270 'CMP DEFAULT PALETTE COLORS
300 DATA 0   , PMODE COLOR 1
301 DATA 12  , PMODE COLOR 2
302 DATA 7   , PMODE COLOR 3
303 DATA 63  , PMODE COLOR 4
304 DATA 0   , LO-RES COLOR 1
305 DATA 12  , LO-RES COLOR 2
306 DATA 7   , LO-RES COLOR 3
307 DATA 63  , LO-RES COLOR 4
308 DATA 0   ,BG COLOR 128-255
309 DATA 18  ,
310 DATA 16  ,
311 DATA 63  ,
312 DATA 16  ,FG COLOR   0-127
313 DATA 32  ,BG COLOR   0-127
314 DATA 0   ,
315 DATA 38  ,
400 SL$(0)="change":SL$(1)="sele
ct"
500 P(0)=161:P(1)=169:P(2)=177:P
(3)=185:P(4)=353:P(5)=361:P(6)=3
69:P(7)=377
600 GB$=CHR$(128)+CHR$(128):N$="
UNTITLED"
700 G1$=CHR$(143):G1$=G1$+G1$+G1
$+G1$+G1$+G1$
800 G2$=CHR$(159):G2$=G2$+G2$+G2
$+G2$+G2$+G2$
900 G3$=CHR$(175):G3$=G3$+G3$+G3
$+G3$+G3$+G3$
1000 G4$=CHR$(191):G4$=G4$+G4$+G
4$+G4$+G4$+G4$
1100 CLS0:A$=INKEY$:PRINTG$;
1200 C$="__BNOXQHFGS_pxwu_AX_DQH
B_VGHSD__":FORX=1TO16:POKE1119+X
,ASC(MID$(C$,X,1))-63:POKE1152-X
,ASC(MID$(C$,33-X,1))-63:NEXT
1300 PRINT@193,G1$GB$G2$GB$G3$GB
$G4$;
1400 PRINT@225,G1$GB$G2$GB$G3$GB
$G4$;
1500 PRINT@257,G1$GB$G2$GB$G3$GB
$G4$;
1600 PRINT@289,G1$GB$G2$GB$G3$GB
$G4$;
1700 PRINT@385,"MODIFY"GB$"MODIF
Y"GB$" SAVE "GB$" LOAD "GB$" LOW
  "GB$" HIGH "GB$"GRAPHS"GB$"GRA
PHS"GB$"SCREEN"GB$"SCREEN"GB$"
TO  "GB$" FROM "GB$"&H0E00"GB$"&
H2600"GB$" DISK "GB$" DISK ";
1800 U$=" "+CHR$(207)+"=##  "+CH
R$(223)+"=##  "+CHR$(239)+"=##
"+CHR$(255)+"=##  ":SC$(0)="HI-S
CRN":SC$(1)="LO-SCRN":B$=CHR$(14
3)
1900 '
2000 PD=0'PICTURE DISK DRIVE NO.
2100 FE$="PIC"'DISK FILE EXTENSI
ON
2200 DE$="/"+FE$+":"+RIGHT$(STR$
(PD),1):PP=OP:KB=0:LD=0:GOTO 310
0
2300 MN=1:GOSUB 10000:MN=0:ON KB
 GOTO 2400,2500,2600,2700,2800
2400 PP=PP+4:GOTO 2900
2500 PP=PP-4:GOTO 2900
2600 PP=PP-1:GOTO 2900
2700 PP=PP+1:GOTO 2900
2800 LD=1:OP=PP
2900 IF LD THEN ON PP+1 GOTO 404
0,4040,4040,4040,9950,9950,3200,
3300
3000 IF PP<0 THEN PP=PP+8 ELSE I
F PP>7 THEN PP=PP-8
3100 PRINT@P(OP),GB$GB$GB$;:OP=P
P:PRINT@P(OP),SL$(INT(OP/4));:GO
TO 2300
3200 Y$="SAVE PICTURE TO DISK":G
OTO3400
3300 Y$="LOAD PICTURE FROM DISK"
:GOTO3400
3400 CLS:GOSUB9700:PRINTSTRING$(
32,140)TAB((32-LEN(Y$))/2)Y$:PRI
NTSTRING$(32,131):PRINT
3500 ON PP-5 GOTO 8600,4100
```

```
3600 A$=INKEY$:IF A$="" THEN 360
0
3700 SOUND200,1:RETURN
3800 PRINT@128,"":PRINTTAB(6)"EN
TER NAME OF PICTURE":PRINT:PRINT
:PRINT@233,"";:INPUTY$:RETURN
3900 CLS
4000 A$=INKEY$:GOTO1100
4040 PMODE P,SC*4+1:SCREEN1,1:NC
=CP(PP)
4050 PALETTE PP+4,NC:PLAY"P10"
4060 GOSUB10000:IF KB=5 THEN CP(
PP)=NC:CP(PP+4)=NC:FORZ=0TO7:PAL
ETTE Z,CP(Z):NEXT:GOTO1100
4070 IF KB=1 THEN NC=NC+1:IF NC>
63 THEN NC=0:SOUND1,1
4080 IF KB=2 THEN NC=NC-1:IF NC<
0 THEN NC=63:SOUND1,1
4090 GOTO 4050
4100 VERIFY ON
4200 IF DT THEN4600
4300 FORX=1TO12:SP(X)=(X-1)*32+1
:SP(X+12)=SP(X)+16:NEXT:Z$="LOAD
>":EX$="exitdisk"
4400 NN=0:FORX=1TO72:P$(X)="":NE
XT
4500 DSKI$ PD,17,18,A$(0),A$(1):
DN$=MID$(A$(1),113,8):DT$=MID$(A
$(1),121,8):FR=FREE(PD)
4600 GOSUB9500
4700 IF DT THEN5000
4800 IF VAL(DT$)=0 THEN 8200
4900 PRINT@66,"WHEN DIR. IS PRIN
TED,USE THE  ARROW KEYS TO SCROL
L THROUGH THE  LIST OF PROGRAMS
ON THE DISK.":GOSUB7400:S=1
5000 S=1:GOSUB7200
5100 FORT=0TO11:Y$=INKEY$:PRINTT
AB(7);LEFT$(P$(S+T),8);TAB(23);L
EFT$(P$(S+T+12),8):NEXTT:PP=1:LD
=0
5200 PRINT@SP(PP),Z$;:P1=PP
5300 GOSUB10000:ON KB GOTO 5400,
5600,5800,6000,6200
5400 PP=PP+1:IF PP>NN THEN PP=NN
5500 GOTO6300
5600 PP=PP-1:IF PP<1 THENPP=1
5700 GOTO 6300
5800 PP=PP-12:IF PP<1 THENPP=1
5900 GOTO 6300
6000 PP=PP+12:IF PP>NN THENPP=NN
6100 GOTO 6300
6200 LD=1:P1=0
6300 IF PP=P1 THEN5200
6400 PRINT@SP(P1),"     ";:IF LD
=0 THEN5200ELSEGOTO8000
6500 IF PP<1THENPP=1
6600 NV=INT((S-1)/24):IFPP>(NN-2
4*NV)THENPP=(NN-24*NV)
6700 IFPP>24THENPP=24
6800 'IFIN=9THEN7100ELSE IFIN<>8
THEN6400 ELSEIFS-24<1THEN6400
6900 'IFIN<>8THEN6400
7000 'PP=1:S=S-24:GOTO5000
7100 GOTO 6400'IF S+24>49 OR S+2
4>NN THEN6400ELSEPP=1:S=S+24:GOT
O5000
7200 PRINT@480,USING"## PICTURE
";NN-1;:IF NN>2 THENPRINTCHR$(8)
"S";
7300 PRINT@0,"";:RETURN
7400 PRINT@232,"READING DIRECTOR
Y"
7500 NN=0:FORZ=3TO11
7600 DSKI$ PD,17,Z,A$(0),A$(1):F
ORQ=0TO1:FORW=0TO3:P$=MID$(A$(Q)
,W*32+1,32):P1$=LEFT$(P$,1):P1=A
SC(P1$):IFP1=0THEN7700ELSEIF P1=
255THENGOTO7800ELSE IF MID$(P$,9
,3)=FE$ THEN NN=NN+1:P$(NN)=P$
7700 NEXTW,Q,Z
7800 POKE&HFF40,0:NN=NN+1:P$(NN)
=EX$
7900 RETURN
8000 IF P$(PP)=EX$ THENDT=0:GOTO
3900ELSEDT=1:LD=0:PRINT@492,"LOA
DING:"LEFT$(P$(PP),8);:PCLS1:SCR
EEN1,1:LOADM LEFT$(P$(PP),8)+DE$
:N$=LEFT$(P$(PP),8)
8010 IF MID$(P$(PP),17,16)=STRIN
G$(16,0) THEN 8100 ELSE FORX=0 T
O 15:CP(X)=ASC(MID$(P$(PP),17+X,
1)):NEXT:FORX=0TO7:PALETTE X,CP(
X):NEXT
8100 PLAY"P50":GOTO 1100
8200 CLS:PRINT@66,"HEY!  THIS DI
SK HAS NO NAME!"
8300 PRINT@96,"  WHAT DO YOU WAN
T TO NAME IT?":PRINT@269,"......
.":PRINT@266,"";:INPUTDN$:IF DN$
=""OR LEN(DN$)>8GOTO8300
8400 PRINT@321,"ENTER TODAY'S DA
TE FOLLOWED BY":PRINT@355,"YOUR
IDENTIFICATION LETTER":PRINT@395
,"YYMM.DDI":PRINT@392,"";:INPUTD
T$:IF DT$="" OR LEN(DT$)<>8THEN8
```

Hint . . .

High-Speed Hijinx

If you want to include the high-speed poke in a program that performs printer output, keep in mind you don't have to turn off the high-speed poke. Just issue a baud rate poke at the beginning of your program that uses a baud value half that which you would normally use. For example, instead of using `POKE 150,1` to set your computer for 9600 baud printing, use `POKE 150,7` to set it to 4800 baud.

James M. Stewart
(WHEELJIMMER)
Highland Falls, NY

```
400
8500 DSKI$ PD,17,18,A$(0),A$(1):
MID$(A$(1),113,16)=STRING$(16,32
):MID$(A$(1),113,8)=DN$:MID$(A$(
1),121,8)=DT$:DSKO$ PD,17,18,A$(
0),A$(1):DT=0:GOTO1100
8600 PRINT@128,"";:A$=INKEY$
8700 IF N$="" THEN INPUT"NAME OF
 PICTURE TO BE SAVED";N$ ELSE Y$
=N$:GOTO8800
8800 PRINT:PRINT:IF Y$="" THENPR
INTTAB(5)"ABORT ILLEGAL FILE NAM
E!":SOUND5,10:GOTO1100
8900 IF SC THEN GOSUB 10700
9000 Y$=LEFT$(Y$,8):SAVEM Y$+DE$
,&HE00,&H25FF,&H0006:IF SC THEN
GOSUB 10700
9100 CP$="":FORZ=0TO15:CP$=CP$+C
HR$(CP(Z)):NEXTZ
9200 FORZ=3 TO 11:DSKI$ PD,17,Z,
A$(0),A$(1):FORQ=0 TO 1:FORW=0 T
O3:IF Y$+FE$=MID$(A$(Q),W*32+1,1
1) THEN MID$(A$(Q),W*32+1+16,16)
=CP$:DSKO$ PD,17,Z,A$(0),A$(1):Z
=11:Q=1:W=3
9300 'PRINT MID$(A$(Q),W*32+1,32
):EXEC44539
9400 NEXT W,Q,Z:GOTO1100
9500 CLS:PRINT@384,STRING$(32,14
3)DN$" "RIGHT$(DE$,2)TAB(11)B$DT
$B$;:PRINTUSING"## GRANULE";FR;:
IF FR>1 THEN PRINT"S"
9600 PRINT@395,B$;:PRINT@404,B$;
:PRINT@391,CHR$(143);:GOTO9800
9700 PRINT@384,STRING$(32,143):P
RINT@416,"PALETTE:";:PRINTUSINGU
$;CP(0),CP(1),CP(2),CP(3)
9800 PRINT@448,STRING$(32,143)"S
CN:";SC$(SC);B$"PICNAME:"N$;LEFT
$(DE$,3);:POKE1535,ASC(RIGHT$(FE
$,1)):PRINT@459,B$;
9900 PRINT@0,"";:RETURN
9950 SC=PP-4
9960 PMODE P,SC*4+1:SCREEN1,1
9970 EXEC44539:GOTO1100
10000 KB=0' READ KEYBOARD
10100 IF PEEK(342)=247 THEN POKE
 342,255:KB=1
10200 IF PEEK(341)=247 THEN POKE
 341,255:KB=2
10300 IF PEEK(343)=247 THEN POKE
 343,255:KB=3
10400 IF PEEK(344)=247 THEN POKE
 344,255:KB=4
10500 IF PEEK(345)=247 OR PEEK(3
38)=191 THEN POKE 345,255:KB=5
10550 IF PEEK(343)=191 THEN SCRE
EN1,1 ELSE IF MN=1 THEN SCREEN0,
0
10600 IF KB=0 THEN 10100 ELSE PL
AY"P255":RETURN
10700 FORX=1TO4:PCOPY X TO 19:PC
OPY X+4 TO X:PCOPY 19 TO X+4:NEX
T:RETURN
```

Listing 2: GALLERY

```
10 '*****************************
20 '* LOW-RES  PICTURE GALLERY *
30 '*    WITH PALETTE CONTROL   *
40 '* VERSION: 1.0     8611.02 *
50 '*****************************
60 '*  (C) 1986 BY ERIC WHITE  *
70 '*****************************
80 A$=INKEY$:F=FREE(PEEK(&HEB))
90 CLS0:PCLEAR8:CLEAR2000:IF PEE
K(33021)=50 THEN PMODE3,5:PCLS0
ELSE PMODE 4,5:PCLS1
100 FE$="PIC"'DISKFILE EXTENSION
110 TM=3500'TIMEOUT BETWEEN PICS
120 DIMNF$(71):X=0:FORS=3TO11
130 DSKI$ PEEK(&HEB),17,S,A$,B$
140 C$=A$+LEFT$(B$,127)
150 FORN=0TO7
160 NF$=MID$(C$,N*32+1,32)
170 IFLEFT$(NF$,1)=CHR$(0)THEN21
0
180 IFLEFT$(NF$,1)=CHR$(255)THEN
N=7:S=11:GOTO210
190 IFMID$(C$,N*32+9,3)<>FE$ THE
N 210
200 NF$(X)=NF$:X=X+1
210 NEXTN,S
220 SCREEN1,1
230 FORI=0TO X-1:IF NF$(I)="" TH
EN CLS:PRINT"THERE IS NO PICTURE
S ON THIS    DISK WITH THE EXTEN
SION -'"FE$"'":END
240 F$=LEFT$(NF$(I),8)+"/"+FE$
250 LOADM F$
260 IF PEEK(33021)=50 THEN FORT=
4TO7:PALETTE T,63:PLAY"P50":NEXT
T
270 FORT=1TO4:PCOPY T TO T+4:NEX
TT
280 IF PEEK(33021)=50 THEN GOSUB
 310
290 FORT=1TO TM:A$=INKEY$:IF A$=
"" THEN NEXTT ELSE T=TM:NEXTT
300 SCREEN1,1:NEXTI:GOTO 230
310 IF MID$(NF$(I),21,4)=STRING$
(4,0) THEN PALETTE 4,0:PALETTE 5
,12:PALETTE 6,21:PALETTE 7,63:RE
TURN
320 FORT=4TO7:PALETTE T,ASC(MID$
(NF$(I),17+T,1)):PLAY"P50":NEXTT
:RETURN
```

Listing 3: PALPRINT

```
10 '****************************
20 '* DECODE AND PRINTS COLORS *
30 '*     LOW-RES PALETTES     *
40 '* VERSION: 1.0     8611.02 *
50 '****************************
60 '*  (C) 1986 BY ERIC WHITE  *
70 '****************************
80 A$=INKEY$:F=FREE(PEEK(&HEB))
90 CLS:PCLEAR8:CLEAR2000
100 FE$="PIC"'DISKFILE EXTENSION
110 PRINT"OUTPUT TO (S)CREEN OR
(P)RINTER"
120 A$=INKEY$:IF A$="" THEN 120
130 IF A$="S" THEN DV=0:GOTO 150
140 IF A$="P" THEN DV=-2 ELSE 90
150 CLS:PRINT" ENTER THE NAME OF
 PICTURE FOR     DECODING OF PAL
ETTE COLORS      OR PRESS [ENTER
] TO DECODE          ALL PICTURES
 ON DISK"
160 PRINT@200,"";:INPUTN$
170 IF N$>"" THEN N$=N$+STRING$(
8-LEN(N$),32)
180 DIMNF$(71):X=0:FORS=3TO11
190 DSKI$ PEEK(&HEB),17,S,A$(0),
A$(1)
200 FOR C=0TO1:FOR N=0TO7
210 NF$=MID$(A$(C),N*32+1,32)
220 IFLEFT$(NF$,1)=CHR$(0)THEN27
0
230 IFLEFT$(NF$,1)=CHR$(255)THEN
N=7:S=11:GOTO270
240 IFMID$(A$(C),N*32+9,3)<>FE$
THEN 270
250 IF N$>"" AND LEFT$(NF$,8)<>N
$ THEN 270
260 NF$(X)=NF$:X=X+1
270 NEXTN,C,S
280 FORI=0TO X-1:IF NF$(I)="" TH
EN 340
290 PRINT#DV,CHR$(27)CHR$(20);'C
ONDENSED PRINT FOR DMP-200
300 CLS:PRINT#DV,"PICTURE NAME:
"LEFT$(NF$(I),8)"/"FE$:PRINT#DV
310 FORT=0 TO 15
320 PRINT#DV,"  SLOT ";:PRINT#DV
,USING"##";T;:PRINT#DV,"="ASC(MI
D$(NF$(I),17+T,1)),
330 NEXT T:IF DV=0 THEN PRINT@45
1,"PRESS ANY KEY TO CONTINUE.";:
EXEC44539 ELSE PRINT#DV:PRINT#DV
340 CLS:NEXTI:GOTO 100
```

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A tutorial on typing in programs

Previewing a Program

By Joseph Kolar
Rainbow Contributing Editor

I was thumbing through the September issue of THE RAINBOW and idling away the time in my hotel room, waiting to compete in the 1987 Florida Star Ball, a dance competition. I plopped down on the bed and flipped to the contents page to see the latest offerings.

The article "Not Just Child's Play" by Ann B. Mayeux caught my eye. Working as a volunteer with learning disabled children at the Lakeview School in Hernando, Florida, I was tempted by the program. I wondered if it might be of value to "my kids."

Upon reading the text and noting that a 32K, ECB CoCo was required for either tape or disk, I turned to the listing.

It was a daunting listing, running for about seven or eight tightly formatted pages. It was the kind of graphics program, loaded with oodles of `DRAW`, `CIRCLE`, `PAINT` and `LINE` statements, that is near and dear to my heart. The illustrations for the A, B and C panels were intriguing. How would they look on my CoCo? Dare I copy the listing? Would the ultimate users — the students — find it to be fun and entertaining?

My gaze turned dreamily to the ceiling and I speculated — if I usurped a few panels and put them on tape, I could bring them to Ms. Hudson's class at Lakeview. If they liked the panels, I'd break down and copy the entire program!

Upon returning home with my trophies, I unpacked and wandered into my computer nest.

One tutorial coming up!

Please open your personal copy of the September '87 issue of THE RAINBOW to pages 60 and 61. (Refer to this month's listing if your copy is lost, has strayed or was stolen). The first question is where the first panel, A, is located. The clue is in the routine from Line 130 to Line 400. Line 140, letter A, sent me searching for Line 410. Line 150, letter B, referred me to Line 510. Ergo, between lines 410 and 510 lay nestled the A panel.

Checking out the lines in question revealed a lot of closely packed, multi-line statements. I drooled in anticipation because closely packed, multi-line statements are a good indication of lots of goodies waiting to be revealed.

Suggestions at the Starting Gate

Instead of mindlessly typing away to reproduce this lengthy program, get out the old ECB manual and reacquaint yourself with `DRAW`, `PAINT`, `CIRCLE` and `LINE` statements. Get their formats straight in your mind. As you key in a statement, try to visualize what you are asking CoCo to do.

After you complete a program line (if you are a conscientious copier), check the characters at the right end of each row with the listing. If they are not the same,you might have left out a character, added unnecessary, though harmless, spaces, or inadvertently slipped in an extra, uncalled-for character. We all do it, so join the club!

Also, check to see under which character the final character in the line falls.

Don't be "smart" and anticipate what you think the author intended or correct what seems to you to be an error in the listing. You will be sorry!

The first thing you know, you become engrossed in seeing each new unit of the program emerge, and you happily clack, clack away far into the night.

After tap, tap, tapping for a few hours at the keyboard, you may get an SN, FC or other error message. Checking and rechecking the listing and the program line does not divulge the error. If it is a multiple-statement program line, perform a little surgery and edit out the last statement and run. Keep it up! Lop off the last statement and run until CoCo doesn't produce the message. Then retype the balance of the line that must have contained the elusive error.

A second way to combat an obstinate gremlin is to rekey the entire line.

If you are still perplexed and unable to discover the boo-boo, ask a disinterested spectator in your household to compare your work with the listing.

A final ploy is to make a few copies of your work in progress and shut down for the day — or night — and sweep out the cobwebs in your mind to get a fresh perspective on the morrow.

Targeting the Listing

My object was to yank out the A panel and display it on the screen.

Beginning at Line 410, I copied and ran the listing up to Line 500. I got the black screen and the sound. Now, `PCLS2` calls for a yellow screen. A `PMODE` was needed. I noticed a `PMODE3,1` in Line 130 and copied this line. Then I copied Line 140, as it directs CoCo to Line 410, the target area.

I ran this three-liner and it became evident that a stop-the-action line would be useful. I settled on `510 GOTO 510`.

Line 510 is the start of the B panel in Ann Mayeux's program. If and when I get to it, I can key in the true program line (which deletes my false Line 510) and continue keying in lines through 580 for the B panel. I can then use Line 590, the beginning of the C panel, as my temporary perpetual loop.

What did I accomplish? I found the first part of the panel. Evidently, an 'A' was printed on a blue background. By running my working program, I found I had no error message to warn me of impending doom. Whew! What a relief! Now, if I had an SN, FC, TM or BS Error, etc., I could search out and correct it as I went along.

I added Line 430 and ran the program. Naturally, I got an FC Error. A quick check proved that I had mis-typed a `9` for a `)`. I edited out the boo-boo and was pleased to see the airplane pop up on the screen.

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

When typing in Line 440, I got an SN Error message. No big deal! I found I spelled `FIR` for `FOR` (note tongue-twister), one of my common garden variety boo-boos. Note: You could go right into the `EDIT` mode. Upon isolating the SN Error, correct it and move on. I prefer to be more relaxed about it and enjoy weeding out my inevitable errors. I begin by entering `LIST 440`. After I pinpoint the error, I get into the `EDIT` mode.

I have found that after many hours at the keyboard, there is a tendency to become weary, and, when in the `EDIT` mode, I usually compound the boo-boo instead of eradicating it. So, like they say, "Slow, but sure."

After all this work, CoCo added what proved to be an alligator's tail to the display.

Adding `LINE 450` drew in the foot. The line was too long; something was missing. A close check revealed that the X motion command was missing. Spelling out the `XAL$;` variables extracted `AL-I-R-P-L-AL-N-E`. `AL` must be the designation for the character A.

Since the alphabet variables must be made known to CoCo before they can be called, a program line with `AL$` must have been created someplace in front of Line 130.

Line 80 started with `AL$`, and a quick review of `AL$="U6E3F3D3NL6D4BR5"` proved that it was a 9-by-6 unit sized A.

Since the lack of variables for the substrings, `XAL$;`, etc., didn't hurt the flowering program displayed, it was onward and upward!

Line 460 produced more of the alligator without any further error mishaps on my part.

Remember, after each additional line, the extant program is run — first, to see what is what, and second, to correct as many mistakes as possible that crop up. The alligator was fleshed out and colored green.

Line 480 was a "word" line, so I didn't expect to see anything new. What I did find out was that, so far, there were no FC and SN Errors — which, being a careless typist, I am an expert at invoking.

Soon I got the drift of Ann Mayeux's programming style. I paid more attention to each line and what it signified. Line 490 was a couple of painted, partial circles. I ran it to verify what I had mentally conjured. I repeated the error where I keyed in a `9` for a `)` in the `CIRCLE` statement. Being aware of the kinds of errors I am prone to make causes me to focus automatically on likely problem areas.

Line 500 looks like it made the apple stem, spelled out the word "apple" and returned to the panel choice routine at Line 130.

When I ran this, CoCo raced through the program, and I hardly saw what happened. An easy solution would have been to temporarily edit out `GOTO130` from Line 500 to hold the display.

Better still, adding the line `400 GOTO 130`, which closed out the `INKEY$` letter-panel choice routine (lines 130 through 400), gave me the excruciating task of tapping the A key to get the A panel. I could delete Line 510 as being redundant.

At this point, I could take a breather and double-check to see if my numerical values were keyed in correctly. CoCo is not likely to complain if you use an incorrect value. It will show up on the screen by distorting the display in some manner. Thus, if you check each line as you add it to your copied program and correct errors you are alerted to (such as SN or FC errors), you can inspect the display for an incorrectly located, drawn or painted item.

If you do these things, you will be correcting a major portion of your errors and have a relatively error-free expanding program.

Suppose Line 500 ended in `GOSUB1000` instead of `GOTO130`. If you ran it, you would get a UL Error.

What happened was that CoCo was directed to a program line that started a subroutine you hadn't yet reached. A temporary solution would be to key in `1000 RETURN`. But this would result in an RG Error. The solution to hold the display is to put something in `LINE1000` that will take it out of its RG Error condition.

Entering `1000 GOTO130:RETURN` works. We used the `INKEY$` routine to exit the `GOSUB` routine.

This should hold everything until you rekey Line 1000 when you finally get to it. But this is only one ploy you can use.

As it stands now, we have the panel complete except for the lettering. In order to present a properly finished display panel to the children, it is a prerequisite to key in lines 80 through 110.

After keying in Line 80, I ran the program and saw that the A's and E's were OK. After keying in and running the next line, Line 90, the G's and L's appeared. Upon keying in Line 100, I was delighted to see "airplane" and "apple" come out perfectly. The 't' was missing in "alligator," but in a few minutes that would be taken care of. After completing Line 110 and running the program, I got the 't' inserted in its rightful place.

I ended up with a complete, and I might add, impressive, panel that I plan to use to amuse and educate the children.

At this time, we might as well verify that all the letters we used and didn't use

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were created without mishap. Temporarily insert these lines:

```
120 PMODE3,1:PCLS2:SCREEN1,0
:DRAW"C4BM10,20"+AL$+B$+C$
+D$+E$+F$:DRAWG$+H$+I$+J$+K$
+L$:DRAWM$+N$+O$+P$+Q$:DRAWR$
+S$+T$+U$+V$
121 DRAW"BM10,40"+W$+X$+Y$
+Z$
129 GOTO130
```

Running this verifies that all letters are OK and the spacing between letters is adequate. Now, pressing the A key gives the A panel.

Let us give credit where credit is due . . . to Ann Mayeux. Key in lines 10 through 30.

The following are the lines we left out. Line 40 looks like the "BREAK key disable" routine. Lines 50 through 70 throw up the title with some musical accompaniment. Line 120 gives a few instructions, and lines 150 through 390 direct CoCo to the B through Z panels. Later, we will add them to our complete program.

All we need is the time and patience to forge onward. This method I have shown you is helpful when keying in long, complex, mind-boggling programs. You can alter it to work with other programs.

Review

First, take a sampling of the program. Who wants to key in a program that takes days of effort and debugging, only to find out it is disappointing?

Second, we debug as we go along, ensuring accurate, error-free work.

Third, as we become familiar with the author's techniques, we can study, absorb, anticipate and appreciate the program lines and the plot as it unfolds.

How would you like to type in the entire program and then drive yourself nuts trying to debug all the errors you keyed in? For instance, take the listing, which is the dollop usurped from Ann Mayeux's original program. Key it in entirely before running it. Then run it and see how difficult it is to track down the errors, even in a straightforward program like this one.

A helpful hint to aid you in your debugging efforts is to become aware of the typing errors you customarily make. If you make a mental list of the kinds of errors you tend to make in DRAW statements, for example, you know what to look out for. In my case, I have a tendency to leave out the opening quote mark, omit the comma between the h,v (horizontal, vertical) values and type a 4 instead of a $. In the LINE statement, I often omit the - or type in = by mistake. Also, I must watch the parentheses, which I am apt to make into an 8 or 9.

Everybody has his or her own set of idiosyncratic mistakes. Become aware of yours and you will be able to make rapid corrections.

On your own, add only the necessary lines to compose the B panel. Delete lines 120 through 129 and add 590 GOTO 590.

Correct as you go along. By now you must be eager to undertake keying in the rest of this delightful program.

Moral of this tutorial: Read, enjoy and, above all, utilize the programs presented for your pleasure in THE RAINBOW. They are a fine learning experience.

Editor's Note: To utilize a Speech/Sound Pak with Ann Mayeux's ABC *program, refer to John Linge's "Sounding Out the ABCs" on Page 142.* ☐

The listing:

```
0 '<LISTING1> EXCERPT FROM-----
10 ' A*B*C
20 ' BY ANN B. MAYEUX
30 ' KEY WEST, FL.
80 AL$="U6E3F3D2NL6D4BR5":B$="U9
R3F2G2L3R4F2G3L3BR11":C$="U9R6BD
9L6BR11":D$="U9R4F2D5G2L4BR11":E
$="U9R6BD4L6D5R6BR5":F$="U9R6BD5
L6D4BR11"
90 G$="U9R6BD4NL2D5L6BR11":H$="U
9D4R6U4D9BR5":I$="NU9BR6":J$="NU
2R6NU9BR5":K$="U9BR6G6E3F3D3BR5"
:L$="NU9R6BR5":M$="U9F4E3D9BR5"
100 N$="U9D2F6DNU9BR5":O$="U9R6D
9L6BR11":P$="U9R6D5L6D4BR11":Q$=
"U9R6D9NF3L6BR11":R$="U9R6D4L6R3
F3D2BR5":S$="R6U5L5U4R5BD9BR5"
110 T$="BR3U9L3R6BD9BR5":U$="NU9
R6NU9BR5":V$="BU9D6F3E3U6BD9BR5"
:W$="NU9E4F4NU9BR5":X$="M+6,-9BL
6M+6,9BR5":Y$="BR3U4H3U2BR6D2G3D
4BR8":Z$="BU9R6D2G6DR6BR5"
120 PMODE3,1:PCLS2:SCREEN1,0:DRA
W"C4BM10,20"+AL$+B$+C$+D$+E$+F$:
DRAWG$+H$+I$+J$+K$+L$:DRAWM$+N$+
O$+P$+Q$:DRAWR$+S$+T$+U$+V$
121 DRAW"BM10,40"+W$+X$+Y$+Z$
129 GOTO130
130 PMODE3,1:A$=INKEY$
140 IFA$="A" THEN410
400 GOTO130
410 PCLS2:SCREEN1,0:PLAY"L6C"
420 DRAW"C3BM0,70R255C2":PAINT(1
00,30),3,3:DRAW"BM10,50M30,20M50
,50BM20,35R20C4"
430 CIRCLE(150,30),50,2,.25,.3,.
05:DRAW"C2BM150,30L20F20R20H20F1
0R30H8R10F10L10H10BU8E12R4D15C4"
440 FORH=120TO170STEP10:PSET(H,2
7,2):NEXTH:CIRCLE(60,145),45,,.8
5,.25,.72:CIRCLE(72,157),35,,.8,
.3,.65
450 DRAW"C2BM120,65XAL$;XI$;XR$;
XP$;XL$;XAL$;XN$;XE$;C4":CIRCLE(
65,138),13,,1.3,.2,.05:DRAW"BM75
,141R5G4F6L5D6H6"
460 DRAW"BM78,138R45E10G10F15G5R
5F5E5R5H20E5G5R65E3U9H3G3L7H3G3L
14H3G3U5E6R3U3E6R3U3E6R3U3E6R3U5
H10L3D5G25"
470 CIRCLE(150,105),10,,1.2,.3,0
:CIRCLE(150,105),5,4:LINE(140,10
5)-(53,110),PSET:PAINT(100,115),
1,4:PAINT(65,138),1,4
480 DRAW"BM70,180XAL$;XL$;XL$;XI
$;XG$;XAL$;XT$;XO$;XR$;"
490 CIRCLE(215,110),10,,1.7:PAIN
T(215,110),4,4:CIRCLE(228,110),1
0,,1.7:PAINT(232,110),4,4
500 DRAW"BM210,85F15U15E10D10G10
":PAINT(230,87),1,4:DRAW"BM200,1
50XAL$;XP$;XP$;XL$;XE$;":GOTO130
```

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The Ultimate Testing Programs

By Fred B. Scerbo
Rainbow Contributing Editor

For over a year now I have been putting off the inevitable. I knew when the CoCo 3 came out I would eventually have to buy one, but I just kept putting it off. Well, I finally succumbed.

Some readers have asked when I would start writing programs for the CoCo 3, but I feel I have some legitimate reasons for putting it off. First, although many people have been buying this dandy, improved model, the overwhelming majority of RAINBOW readers still have CoCo 1s or 2s. The last thing I want to do is write programs that would be useless to the majority of my readers. Second, I was a little too cheap to put up the money for a whole new system. However, when the price of the full system finally dropped below $300, the time seemed right to make the move. It also gave me an extra system (my old one) to bring to school and use with my students. (More on that later!!)

New Worlds to Conquer

Needless to say, it didn't take me long to fall in love with the CoCo 3, which is everything the original CoCo wasn't. My first reaction was, naturally, to come up with a program to celebrate my new purchase. However, I made a pledge to myself and to all my readers: Unless I am using CoCo 3 graphics (which will be some time to come, at least in this column), any program I write for the CoCo 3 will include changes that allow it to work on a CoCo 1 and 2.

Once Upon a Time

Many moons ago, when I first started writing the "Wishing Well," I presented a program called *Multiple Choice Quizmaker.* There were two versions of that program, a Hi-Res version that used real upper- and lowercase letters and a Lo-Res version that used the CoCo's text characters. I later listed a hard copy version that would create paper tests with a line printer.

For several years, I have been tempted to combine the two programs into one so they could use the same DATA statements. Normally, I would just merge the data from one program to the other; however, that is not the best way to have new readers accomplish the task. Owning the new CoCo 3 provided a perfect excuse to make a new version and to throw in speech from the Speech Pak, as well. Besides, many readers still ask me for copies of old programs or reprints of old articles, which I have neither the time nor resources to provide! Making a whole second generation of these programs would solve this problem very easily.

The Program

SuperTest will take a set of phrases you generate in BASIC DATA statements and turn them into a random quiz on the screen or on paper. Every time the program is run, the results are different. In fact, it's a different test each time you run it.

In order to create any quiz or test, you need to match two pieces of information, such as a question and an answer, or a sentence with a blank and information to fill it, synonyms (two words that mean the same thing) and so on. You would need at least five groups in order to make a quiz on *SuperTest.*

All information is stored in DATA statements at the end of the program. *SuperTest* can easily be rewritten to use disk files; however, when I write an educational program for my students, I like to have the program free-standing so that no information needs to be loaded into it. Besides, it is so much easier to edit a line in the program using BASIC's EDIT command than it is to try to edit a file.

There are great advantages in using this type of program, whether with students in school or with your own youngsters at home. Reviewing material with a computer makes it easier to strengthen many skills, including foreign language translations (*bon jour*: good day).

In order to put your own DATA into my program, you must first type DEL1000-5000 and press ENTER. This dumps the sample data I have put in. Let's say you want to do synonyms; your data would start in Line 1000 and

```
NAME__________________________________________________________DATE_________

TEST ON: EXPLORING OUR SOLAR SYSTEM

1. GALILEO ______
   (1) VEHICLES SENT TO JOVIAN PLANETS
   (2) DISTANCE FROM THE EARTH TO THE SUN
   (3) NUMBER OF EARTHS THAT WOULD FIT INSIDE JUPITER
   (4) WHAT THE SURFACE OF MARS IS COVERED WITH
   (5) NOT GIVEN

2. PIONEER ______
   (1) DISTANCE FROM THE EARTH TO THE SUN
   (2) FIRST VEHICLE SENT TO JUPITER AND SATURN
   (3) WHAT THE SURFACE OF MARS IS COVERED WITH
   (4) VEHICLES SENT TO JOVIAN PLANETS
   (5) NOT GIVEN
```

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

look like this:

```
1000 DATA HAPPY,GLAD
1010 DATA LOUD,NOISY
```

Your last data line should be Line 5000 and have `END` as a flag and the title of your program separated by a comma.

```
5000 DATA END,SYNONYMS 1
```

The comma must be placed between each of the two pieces of data you want matched. If your statement needs to include a comma, wrap each segment in quotation marks, like this:

```
1000 DATA "ABRAHAM, MARTIN AND
JOHN","BY DION"
```

Without the quotation marks, BASIC would assume that the comma after `ABRAHAM` was the end of our first statement. When in doubt, wrap in quotes or put each statement into a separate line:

```
1000 DATA "ABRAHAM, MARTIN AND
JOHN"
1005 DATA "BY DION"
```

In this case, no comma is needed between statements, and all information is wrapped in quotes.

The program is designed to hold 50 `DATA` statements. You may increase the number, if you wish, by changing the value of `NM` in Line 180, which presently reads `180 NM=50`. This would change all other values such as the `DIM` statements for our arrays.

Changes for CoCo 1 and 2

This program will work very easily on a CoCo 1 or 2 but will not have some extra screens the CoCo 3 version uses. If you use the program on a CoCo 1 or 2, you must delete the following lines: 9, 315, 320, 325, 330, 335, 340, 410 and 535. You should add the following lines:

```
315 SW=31
410 REM
535 REM
```

Rather than delete the above lines, you could insert `REM` at the beginning of each line except the new Line 315. This way, if you upgrade to a CoCo 3, you won't have to add these lines back in later. Either way, the program will run much like the original. The only difference is the lack of real upper- and lowercase letters. This is not that serious a drawback; however, if you have small pieces of information, such as single words, the regular 32-character screen of the CoCo is much better — you won't have much blank screen area.

A New Feature

Besides speech, I have added one new feature to both the paper and screen quiz parts of the program. The original programs allowed for four choices plus `5) NOT GIVEN`. I put this option into the original program because some of the standardized tests that our students take include "not given" as a choice. However, in the past few years I have found that many of my students have a rough time with the "not given" category. (Also, my special needs students are usually exempt from taking group tests.) Therefore, the screen will allow you to choose whether or not you want the "not given" category included.

Running the Program

There is really not too much more to say about the program, since it is self-prompting. Pressing the @ key during a question allows you to check your score. Pressing C continues the program where you left off.

If you use the `HARDCOPY` section, you may use either standard or double-width characters, selectable from the keyboard. As the test is printed, the printing will stop as you approach the bottom of the page. You may print the next line of text by pressing N. This helps prevent the choices of a question from being printed on different pages. You may then advance the paper to the next page and press ENTER to continue printing.

The listing printed here has no bugs. If you get an OD Error, you probably made a mistake in the `DATA` statements at the beginning of the listing. You may even get an FC Error as a result of having made a mistake in the data as you typed it in. Make sure to correctly type in every comma and number as they appear in these opening lines, or the program will crash.

Try this program with your own data. I think you will find it very useful when working with your children or students. *SuperTest* can be useful even to college students. It gives you a real hand with controlled learning via computer.

Be sure to let me know if you have other ideas for CoCo 3 programs that won't cast our CoCo 1 and 2 owners adrift.

Help Me, Please!

At this point I would like to make a personal pitch to you, my reading audience, who have been so supportive. This year I received some of the toughest special needs students I have ever had to work with. While, in recent years, only a few of my students in a given class period have worked on the CoCo, this year I have groups as large as eight students needing computer time.

Fortunately, I have been able to expand the number of CoCo stations in

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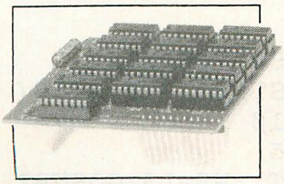

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my room to five. Some friends donated old silver case CoCos they no longer use *since upgrading* to a CoCo 2 or 3. That's when this idea hit me.

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Any such donation to a school can be claimed as a tax deduction, but you would have to consult your tax preparer to determine how to go about it. I can easily supply you with a receipt for tax purposes should you make such a donation.

So, how about it? If you have any CoCos you can spare, you can contact me at (413) 663-9648 most evenings between 9 and 11 p.m. I can't promise to reimburse you for shipping; however, I will promise that any machines, drives, tape players or other CoCo accessories you donate will be put to use helping either my special needs students or special needs students in the middle and elementary school levels. (We can even use old ROM-Pak versions of *Color Scripsit*.)

CoCos may be sent either to Fred B. Scerbo, 60 Harding Ave., North Adams, MA 01247 or to Drury High School, Special Needs Department, South Church St., North Adams, MA 01247, Attn: Fred B. Scerbo.

Any help will be greatly appreciated, and all donations will be put to extremely good use. Thank you.

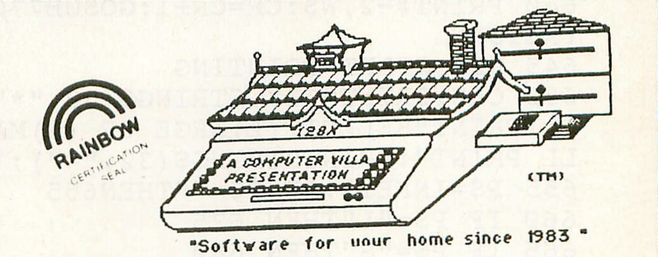
If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.

45	100	570	8
145	40	685	4
260	29	760	231
350	172	1040	113
470	192	END	182

The listing: SUPRTEST

```
1 REM***************************
2 REM*         SUPERTEST        *
3 REM*    A TEACHER'S HELPER    *
4 REM*     BY FRED B.SCERBO     *
5 REM*    60  HARDING AVENUE    *
6 REM*  NORTH ADAMS,MA 01247    *
7 REM*    COPYRIGHT (C) 1987    *
8 REM***************************
9 WIDTH 32
10 CLEAR3000:CLS0:PRINTSTRING$(3
2,172)STRING$(32,204);
15 FORI=1TO192:READA:PRINTCHR$(A
+128);:NEXT
20 PRINTSTRING$(32,195)STRING$(3
2,163);
25 DATA30,28,29,21,,21,21,28,28,
26,30,28,29,21,28,28,29,53,60,61
,60,61,53,60,61,53,60,60,58,62,6
2,61
30 DATA26,,20,21,,21,21,,,26,26,
,20,21,,,21,52,,53,,52,53,,52,53
,,,56,56,58,52
35 DATA27,19,19,21,,21,21,19,19,
26,27,19,18,21,19,19,23,,,53,,,5
3,51,51,53,51,51,50,,58,
40 DATA,,21,21,,21,21,,,,26,,16,
21,16,25,16,,,53,,,53,,,,,,58,,5
8,
45 DATA18,,21,21,,21,21,,,,26,,1
7,21,,,25,,,53,,,53,,49,49,,,58,
,58,
50 DATA27,19,23,21,19,23,21,,,,2
7,19,23,21,,,21,,,55,50,,53,51,5
5,53,51,51,58,49,59,
55 PRINT@357,"  A TEACHER'S HELP
ER  ";:PRINT@389," (P)APER OR (S
)CREEN  ";
60 PRINT@421,"   BY FRED B.SCERB
O   ";
65 PRINT@453,"  COPYRIGHT (C) 19
87  ";
70 X$=INKEY$:IFX$="S"THEN HC=0:G
OTO85
75 IFX$="P"THEN HC=1:GOTO180
80 GOTO70
85 PRINT@389," (T)ALKING OR (N)O
T ? ";
90 X$=INKEY$:IFX$="T"THEN110
95 IFX$="N"THEN105
100 GOTO90
105 NT=1
110 REM TALKING
115 XX=&HFF00:YY=&HFF7E
120 POKEXX+1,52:POKEXX+3,63
125 POKEXX+35,60
130 GOTO180
135 IFNT=1THENRETURN
140 FORII=1TOLEN(W$)
145 IF PEEK(YY)AND 128=0 THEN145
150 POKEYY,ASC(MID$(W$,II,1))
155 NEXTII
160 IFPEEK(YY)AND128=0THEN160
165 POKEYY,13
170 FORHH=1TO900:NEXTHH:RETURN
175 RETURN
180 NM=50
185 DIMAO(NM),A$(NM),B$(NM),NP(N
M)
190 GOTO225
195 IF LEN(JK$)<=SW THEN215
200 FOR T=SW TO 0STEP-1:IF MID$(
JK$,T,1)=" "THEN210
205 NEXT T:GOTO215
210 L$=LEFT$(JK$,T):W$=L$:GOSUB2
20:JK$="    "+RIGHT$(JK$,(LEN(JK$
))-T):GOTO195
```

```
215 W$=JK$:PRINTW$:GOSUB135:RETU
RN
220 PRINTW$::GOSUB135:RETURN
225 FORJ=1TO NM:READ A$(J),B$(J)
:IF A$(J)="END" THEN235
230 NEXTJ
235 REM TITLE CARD
240 PRINT@357,"    DO YOU WANT TH
E   ";:PRINT@389," DATA REVERSED
 (Y/N)? ";
245 T$=INKEY$:UH=RND(6666):IF T$
="N"THEN 265
250 IF T$="Y" THEN260
255 GOTO245
260 FOR Q=1 TO J-1:TEM$=A$(Q):A$
(Q)=B$(Q):B$(Q)=TEM$:NEXT Q
265 J=J-1
270 FORI=1 TO J
275 AO(I)=RND(J)
280 IF NP(AO(I))=1 THEN 275
285 NP(AO(I))=1:NEXTI
290 CLS:PRINT@202,"DO YOU WANT":
PRINT@234,"'NOT GIVEN'":PRINT@26
6,"AS A CHOICE":PRINT@297,"(Y)ES
 OR (N)O?"
295 X$=INKEY$:IFX$="Y"THEN FS=0:
GOTO310
300 IFX$="N"THEN FS=1:GOTO310
305 GOTO295
310 IF HC=1THEN605
315 CLS:PRINT@169,"SELECT WIDTH"
:PRINT@233,"(A) WIDTH 32":PRINT@
265,"(B) WIDTH 40":PRINT@297,"(C
) WIDTH 80"
320 X$=INKEY$:IFX$=""THEN320
325 IFX$="A"THEN WIDTH 32:SW=31:
GOTO350
330 IFX$="B"THEN WIDTH 40:SW=39:
GOTO350
335 IFX$="C"THEN WIDTH 80:SW=79:
GOTO350
340 GOTO320
350 FOR P=1TOJ:GOSUB355:GOTO415
355 CLS
360 FORQ=1TO5:C(Q)=0:NEXT
365 FOR Q=1TO4-FS
370 C(Q)=RND(J):IF C(Q)=AO(P) TH
EN370
375 FOR K=Q-1 TO 0STEP-1:IF C(K)
=C(Q) THEN370
380 NEXTK
385 NEXTQ:C(5-FS)=AO(P)
390 FOR E=1TO5-FS
395 F(E)=RND(5-FS)
400 FOR K=E-1 TO 0 STEP-1:IF F(K
)=F(E) THEN395
405 NEXTK,E:RETURN
410 WIDTH SW+1
415 CLS:PRINT:JK$="    "+A$(AO(P)
):GOSUB195
420 PRINT
425 JK$=" 1-"+B$(C(F(1))):GOSUB1
95
430 IFSW<>31THENPRINT
435 JK$=" 2-"+B$(C(F(2))):GOSUB1
95
440 IFSW<>31THENPRINT
445 JK$=" 3-"+B$(C(F(3))):GOSUB1
95
450 IFSW<>31THENPRINT
455 JK$=" 4-"+B$(C(F(4))):GOSUB1
95
460 IF FS=1 THEN 475
465 IFSW<>31THENPRINT
470 JK$=" 5-NOT GIVEN":GOSUB195
475 G$=INKEY$:IFG$="@"THEN535
480 IF G$=""THEN475
485 G=VAL(G$)
490 IF G<1 THEN 475
495 IF G>5-FS THEN 475
500 IF C(F(G))<>AO(P) THEN515
505 PRINT:JK$="     YOU ARE CORREC
T! THE ANSWER IS: "+B$(AO(P)):GO
SUB195
510 CR=CR+1:GOTO525
515 PRINT:JK$="     WRONG! THE COR
RECT ANSWER IS: "+B$(AO(P)):GOSU
B195
520 IR=IR+1
525 X$=INKEY$:IFX$<>CHR$(13)THEN
```



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```
525
530 NEXT P
535 WIDTH 32
540 CLS:PRINT:PRINT:PRINT:PRINT
545 L=CR+IR:IF L=0 THEN L=1
550 PRINT"    NUMBER CORRECT = "
CR
555 PRINT
560 PRINT"    NUMBER WRONG   = "
IR
565 PRINT:PRINT"     STUDENT SCOR
E  = ";INT(CR*100/L);"%"
570 PRINT:PRINT"     ANOTHER TRY
(Y/N/C)";
575 W$=INKEY$:IFW$=""THEN575
580 IF W$="Y" THEN RUN
585 IF W$="N" THEN END
590 IF W$="C" THEN 410
595 GOTO575
600 REM ***** START HARDCOPY ***
605 CLS0
610 CLS0:GOTO645
615 IF LEN(JK$)<=SW THEN635
620 FOR T=SW TO 0STEP-1:IF MID$(
JK$,T,1)=" "THEN630
625 NEXT T:GOTO635
630 L$=LEFT$(JK$,T):W$=L$:GOSUB6
40:JK$="        "+RIGHT$(JK$,(LEN(J
K$))-T):GOTO615
635 PRINT#-2,JK$:CR=CR+1:RETURN
640 PRINT#-2,W$:CR=CR+1:GOSUB770
:RETURN
645 REM START PRINTING
650 CLS:PRINT@128,STRING$(32,"*"
);:PRINT"SELECT (L)ARGE OR (S)MA
LL PRINT":PRINTSTRING$(32,"*");
655 P$=INKEY$:IF P$=""THEN655
660 IF P$="L"THEN 675
665 IF P$="S"THEN 680
670 GOTO655
675 SW=38:PL=46:TL=8:LL=21:PS=31
:GOTO685
680 SW=76:PL=46:TL=14:LL=53:PS=3
0
685 PRINT:PRINTSTRING$(32,"*");:
PRINT"PRESS <ENTER> TO BEGIN PRI
NTING":PRINTSTRING$(32,"*");
690 P$=INKEY$:IF P$=CHR$(13)THEN
700
695 GOTO690
700 PRINT#-2,CHR$(PS);" NAME";ST
RING$(LL,&H5F);"DATE";STRING$(TL
,&H5F)
705 PRINT#-2," TEST ON: ";B$(J+1
):PRINT#-2," ":CR=4
710 FOR P=1 TO J
715 GOSUB355
720 JK$=ID$+STR$(P)+". "+A$(AO(P
))+" "+STRING$(6,&H5F)+"   ":GOSU
B615
725 PRINT
```

```
730 JK$="      (1) "+B$(C(F(1))):GO
SUB615:GOSUB770
735 JK$="      (2) "+B$(C(F(2))):GO
SUB615:GOSUB770
740 JK$="      (3) "+B$(C(F(3))):GO
SUB615:GOSUB770
745 JK$="      (4) "+B$(C(F(4))):GO
SUB615:GOSUB770
750 IF FS=1 THEN760
755 JK$="      (5) NOT GIVEN":GOSUB
615:GOSUB770
760 GOSUB770
765 PRINT#-2," ":GOSUB770:NEXTP:
RUN
770 IF CR<=PL THEN RETURN
775 CLS:PRINT:PRINTSTRING$(32,"*
");:PRINTTAB(2)"ADVANCE PAPER TO
 NEXT SHEET":PRINTTAB(3)"PRESS <
ENTER> TO CONTINUE"
780 PRINT"  PRESS (N) FOR NEXT L
INE ONLY":PRINTSTRING$(32,"*");
785 P$=INKEY$:IF P$=CHR$(13) THE
N CR=0:RETURN
790 IF P$="N" THEN RETURN
795 GOTO785
990 REM ENTER DATA AT LINE 1000
1000 DATA RED,COLOR OF THE SURFA
CE OF MARTIAN SOIL
1010 DATA VOLCANOES AND CRATERS,
WHAT THE SURFACE OF MARS IS COVE
RED WITH
1020 DATA THREE HUNDRED MILES WI
DE,THE WIDTH OF MARS LARGEST VOL
CANO
1030 DATA GALILEO, DISCOVERED TH
E MOONS OF JUPITER
1040 DATA ELEVEN,THE NUMBER OF E
ARTHS THAT WOULD FIT ACROSS THE
WIDTH OF JUPITER
1050 DATA THIRTEEN HUNDRED,NUMBE
R OF EARTHS THAT WOULD FIT INSID
E JUPITER
1060 DATA RED SPOT, A LARGE STOR
M ON THE SURFACE OF JUPITER
1070 DATA TEN HOURS,THE TIME IT
TAKES JUPITER TO ROTATE ONCE
1080 DATA 1 A.U. (ASTRONOMICAL U
NIT),DISTANCE FROM THE EARTH TO
THE SUN
1090 DATA VIKING,THE FIRST VEHIC
LE TO SOFT LAND ON MARS
1100 DATA ANY SIGNS OF LIFE.,WHA
T SCIENTISTS DIDN'T FIND ON MARS
1110 DATA PIONEER,FIRST VEHICLE
SENT TO JUPITER AND SATURN
1120 DATA VOYAGER 1 & 2,VEHICLES
 SENT TO JOVIAN PLANETS
1130 DATA END,EXPLORING OUR SOLA
R SYSTEM
5000 DATA END,EXPLORING OUR SOLA
R SYSTEM
```

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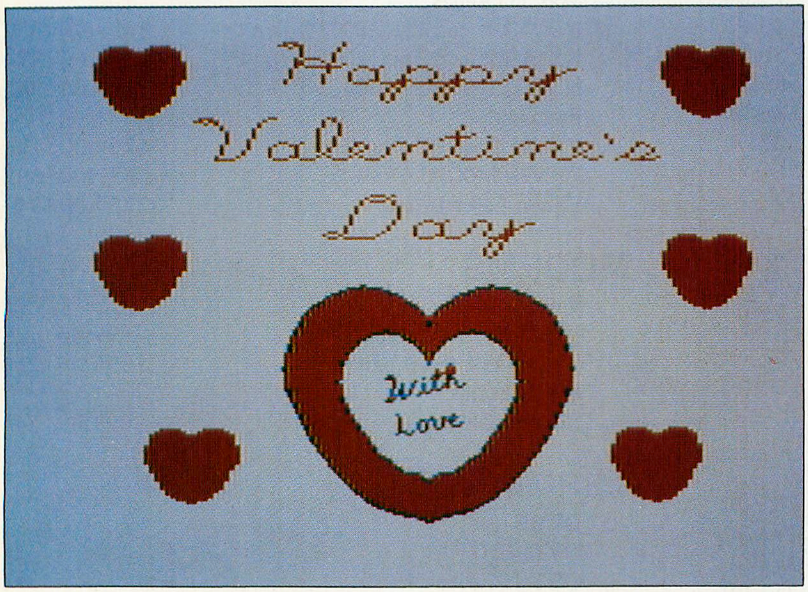
An electronic Valentine's card for the one you love

Wear Your Heart on Your Screen

By Brian Catlett



Valentine's Day is fast approaching — it's time to throw off your shyness and let that special person know how you really feel. But if the words get in your way, let *Valentine* and the CoCo speak for you.

In order to use a fancy script type for the words, for visual appeal, I had to resort to writing a long series of `DATA` statements to print the words to the screen. In fact, the `DATA` statements take up more than one-third of the program and were laborious to write, let me tell you!

But love's labor is not lost! If, for some reason (extremely unlikely), your beloved is not bowled over by the expression of your sentiment, merely show him or her a listing of the program, pointing out that you had to exercise Herculean precision to ensure that every number in those `DATA` statements was copied accurately. That should do it.

After you have typed in and saved the program, run it. The screen should be red; if it is not, press the reset button and run again. And if anyone out there knows a way to make love's labor less tedious (how to get around all those `DATA` statements) without losing the effect, please write and let me know.

(Questions or comments about this program may be directed to the author at 6801 Mountain Rd., NE, Albuquerque, NM 87110. Please enclose an SASE when writing for a response.) ☐

Brian Catlett holds a degree in computer science from Widener University in Chester, Pennsylvania. He enjoys working with computer graphics and animation and is presently working for a drafting company.

350	60	2060	131
550	145	2110	222
830	147	2160	25
2010	125	END	133

The listing: VALNTINE

```
10 '*****************************
20 '*          H A P P Y        *
30 '*   V A L E N T I N E ' S   *
40 '*            D A Y          *
50 '* BY BRIAN CATLETT 1985     *
60 '*     BOX 297               *
70 '*     WIDENER UNIVERSITY    *
80 '*     CHESTER, PA. 19013    *
90 '*****************************
100 PCLEAR8:DIM H(5,31):RESTORE
110 PMODE4,1:PCLS1:SCREEN1,1
120 PMODE3:PCLS3
130 IF INKEY$="" THEN 130
140 PMODE4,1:PCLS1
150 W=2
160 FOR C=1TO400:NEXT
200 '* WRITE "HAPPY" *
210 FOR D=1TO191
220 READ X,Y
230 PSET (W*X+73,Y+2,0)
240 NEXT
250 '* WRITE "VALENTINES" *
260 FOR D=1TO228
270 READ X,Y
280 PSET(W*X+41,Y+30,0)
290 NEXT
300 '* WRITE "DAY" *
310 FOR D=1TO110
320 READ X,Y
330 PSET(W*X+89,Y+58,0)
340 NEXT
350 '* CHANGE SCREENS *
360 '* TO DRAW HEARTS *
370 PMODE4,5
380 PCOPY1TO5:PCOPY2TO6:PCOPY3TO
7:PCOPY4TO8
390 '* DRAW SMALL HEART *
400 CIRCLE(124,120),10,0,1,.4,.9
410 CIRCLE(140,120),10,0,1,.6,.1
420 CIRCLE(132,99),22,0,1.8,.13,
.38
430 POKE178,2
440 PAINT(128,120),,0
450 CIRCLE(124,120),10,,1,.4,.9
460 CIRCLE(140,120),10,,1,.6,.1
470 CIRCLE(132,99),22,,1.8,.13,.
38
480 GET(113,109)-(153,140),H,G
490 POKE178,3
500 LINE(113,109)-(151,140),PSET
,BF
510 '* DRAW LARGE HEART *
520 CIRCLE(104,120),30,0,1,.45,.
92
530 CIRCLE(112,124),18,0,1,.45,.
94
540 CIRCLE(152,120),30,0,1,.595,
.07
550 CIRCLE(144,124),18,0,1,.59,.
07
560 CIRCLE(128,72),64,0,1.6,.1,.
42
570 CIRCLE(128,38),51,0,2.4,.15,
.36
```

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```
580 POKE178,2
590 PAINT(128,105),,0
600 '* SWITCH SCREENS TO *
610 '* DISPLAY HEART     *
620 PMODE4,5:SCREEN1,1
630 '* WRITE "WITH" *
640 FOR D=1TO80
650 READ X,Y
660 PSET(X+112,Y+122,0)
670 NEXT
680 '* WRITE "LOVE" *
690 FOR D=1TO46
700 READ X,Y
710 PSET(X+116,Y+136,0)
720 NEXT
730 '* PUT HEARTS ON SIDES *
740 PUT(1,1)-(41,32),H,AND
750 PUT(215,1)-(255,32),H,AND
760 PUT(1,70)-(41,101),H,AND
770 PUT(215,70)-(255,101),H,AND
780 PUT(21,139)-(61,170),H,AND
790 PUT(195,139)-(235,170),H,AND
800 '* SWITCH SCREENS TO     *
810 '* DRAW EXSPANDED HEART *
820 PCOPY5TO1:PCOPY6TO2:PCOPY7TO
3:PCOPY8TO4
830 PMODE4,1
840 POKE178,2
850 CIRCLE(104,120),30,,1,.45,.9
2
860 CIRCLE(152,120),30,,1,.595,.
07
870 CIRCLE(128,72),64,,1.6,.1,.4
2
880 CIRCLE(103,120),40,0,1,.45,.
86
890 CIRCLE(153,120),40,0,1,.65,.
07
900 CIRCLE(128,69),74,0,1.6,.1,.
42
910 PAINT(128,95),,0
920 '* FLIP BETWEEN BOTH *
930 '* SCREENS TO MAKE   *
940 '* HEART PULSE       *
950 PMODE4,1:SCREEN1,1
960 FORD=1TO500:NEXT
970 PMODE4,5:SCREEN1,1
980 FORD=1TO500:NEXT
990 GOTO950
1000 GOTO1000
2000 'DATA FOR "HAPPY"
2010 DATA 0,1,1,0,2,0,3,1,2,2,1,
1,3,0,4,1,4,2,4,3,4,4,4,5,3,6,3,
7,3,8,3,9,2,10,2,11,2,12,2,13,1,
14,1,15,12,0,12,1,11,2,11,3,10,4
,10,5,10,6,10,7,9,8,9,9,9,10,9,1
1,8,12,8,13,8,14,8,15,8,7,7,6,6,
6,5,6,4,7,4,8,5,9,6,9,7,9,8,9,10
,9,11,9,12,8
2020 DATA 17,10,16,9,15,9,14,10,
13,11,13,12,13,13,13,14,14,15,15
,15,16,15,17,14,18,13,18,12,18,1
1,18,10,19,9,18,14,19,15,20,15,2
1,15,22,14,23,13,23,12,24,11,24,
10,24,9,23,14,23,15,23,16,22,17,
22,18,21,19,21,20,21,21,20,22,19
,21,19,20,19,19,20,18
2030 DATA 20,17,21,16,22,15,25,1
0,26,9,27,9,28,10,29,11,29,12,29
,13,28,14,27,15,26,15,25,15,24,1
4,28,15,29,15,30,15,31,15,32,14,
33,13,33,12,34,11,34,10,34,9,33,
14,33,15,33,16,32,17,32,18,31,19
,31,20,31,21,30,22,29,21,29,20,2
9,19,30,18,30,17
2040 DATA 31,16,32,15,35,10,36,9
,37,9,38,10,39,11,39,12,39,13,38
,14,37,15,36,15,35,15,34,14,38,1
5,39,15,40,15,41,15,42,14,43,13,
43,12,44,11,44,10,45,9,46,9,47,1
0,47,11,47,12,46,13,46,14,47,15,
48,15,49,14,50,13,50,12,51,11,51
,10,51,9,51,12,51,13
2050 DATA 51,14,50,15,50,16,49,1
7,49,18,49,19,48,20,48,21,47,22,
46,21,46,20,46,19,47,18,47,17,48
,16,49,15,50,14,52,12,53,11,54,1
0,55,10
2060 'DATA FOR "VALENTINE'S"
2070 DATA 0,1,1,0,2,0,3,1,2,2,1,
1,3,0,4,1,4,2,5,3,5,4,6,5,6,6,6,
7,6,8,6,9,5,10,5,11,5,12,5,13,4,
14,4,15,5,15,6,15,7,15,8,14,9,13
,9,12,10,11,10,10,10,9,10,8,11,7
,11,6,11,5,11,4,12,3,12,2,13,1,1
4,0,15,0
2080 DATA 18,10,17,9,16,9,15,10,
14,11,14,12,14,13,14,14,15,15,16
,15,17,15,18,14,19,13,19,12,19,1
1,19,10,20,9,19,14,20,15,21,15,2
2,15,23,14,24,13,25,12,25,11,26,
10,26,9,26,8,26,7,27,6,27,5,27,4
,27,3,27,2,26,1,26,0,25,0,24,1,2
4,2,24,3
2090 DATA 23,4,23,5,23,6,23,7,23
,8,23,9,23,10,23,11,23,12,25,14,
26,15,27,15,28,15,29,14,30,13,31
,12,32,11,32,10,31,9,30,9,30,10,
29,11,29,12,31,14,32,15,33,15,34
,15,35,14,36,13,36,12,36,11,37,1
0,38,9,39,9,40,10,40,11,40,12,39
,13,39,14,39,15
2100 DATA 41,10,42,9,43,9,44,10,
44,11,43,12,43,13,43,14,44,15,45
,15,46,15,47,14,48,13,48,12,48,1
1,49,10,49,9,49,8,49,7,49,6,49,5
,50,4,50,3,49,14,50,15,51,15,52,
15,53,14,54,13,54,12,55,11,55,10
,55,9,55,14,56,15,57,15,58,15,59
,14,60,13
2110 DATA 60,12,60,11,61,10,62,9
,63,9,64,10,64,11,64,12,63,13,63
```

```
,14,63,15,65,10,66,9,67,9,68,10,
68,11,67,12,67,13,67,14,68,15,69
,15,70,15,71,14,72,13,73,12,74,1
1,74,10,73,9,72,9,72,10,71,11,71
,12,73,14,74,15,75,15,76,14,77,6
,77,7,78,8,78,9
2120 DATA 79,15,80,14,81,13,82,1
2,82,11,83,10,83,9,84,9,85,10,86
,11,86,12,85,13,84,14,83,15,82,1
5,81,14,84,15,85,15,86,15,87,14,
46,8,47,7,48,7,49,7,50,7,51,7,52
,6,55,7
2130 'DATA FOR "DAY"
2140 DATA 10,0,9,0,8,1,7,2,7,3,6
,4,6,5,6,6,5,7,5,8,5,9,5,10,4,11
,4,12,4,13,3,14,2,15,1,15,0,14,1
,13,2,13,4,15,5,15,6,15,7,15,8,1
5,9,15,10,14,11,13,12,12,12,11,1
3,10,13,9,14,8,14,7,14,6,14,5,14
,4,13,3,13,2,12,1,11,0,9,2,10,2,
11,2,13,0
2150 DATA 21,10,20,9,19,9,18,10,
17,11,17,12,17,13,17,14,18,15,19
,15,20,15,21,14,22,13,22,12,22,1
1,22,10,23,9,22,14,23,15,24,15,2
5,15,26,14,27,13,27,12,28,11,28,
10,29,9,30,9,31,10,31,11,31,12,3
0,13,30,14,31,15
2160 DATA 32,15,33,14,34,13,34,1
2,35,11,35,10,35,9,35,12,35,13,3
5,14,34,15,34,16,33,17,33,18,33,
19,32,20,32,21,31,22,30,21,30,20
,30,19,31,18,31,17,32,16,33,15,3
4,14,36,12,37,11,38,10,39,10
2170 'DATA FOR "WITH"
2180 DATA 0,1,1,0,2,0,2,1,1,1,3,
1,3,2,3,3,3,4,2,5,2,6,2,7,1,8,0,
9,1,9,2,9,3,8,4,7,5,6,5,5,6,4,6,
3,6,5,6,6,6,7,6,8,7,8,8,7,9,6,9,
5,10,4,10,3,11,2,12,7,13,6,14,5,
14,4,14,3,15,6
2190 DATA 16,6,17,5,18,4,18,3,18
,2,19,1,19,0,19,-1,19,-2,19,5,20
,5,21,4,22,3,23,2,24,1,24,0,25,-
1,25,-2,25,-3,24,-4,23,-3,23,-2,
23,-1,23,0,23,1,23,2,23,3,23,4,2
4,1,25,1,26,2,26,3,27,4,28,4,29,
3,14,1,17,1,18,0,19,0,20,0,21,-1
2200 'DATA FOR "LOVE"
2210 DATA 0,0,1,1,1,2,1,3,1,4,1,
5,1,6,0,7,2,6,3,6,4,7,5,7,6,6,10
,2,9,2,8,3,8,4,8,5,9,6,10,6,11,5
,11,4,11,3,12,2,13,1,14,2,14,3,1
4,4,15,5,16,5,17,4,17,3,17,2,17,
1,18,1,19,2,20,2,21,2,22,1,21,0,
20,1,20,3,21,4,22,4,23,4,24,3
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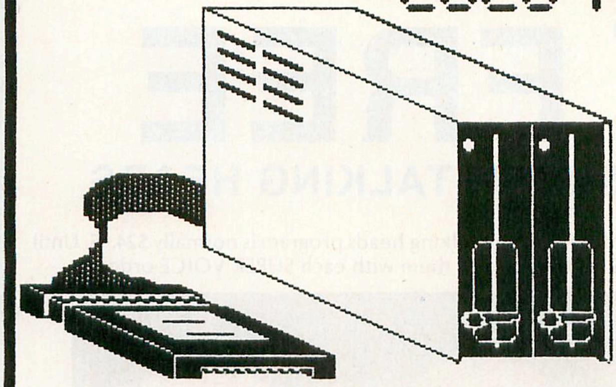
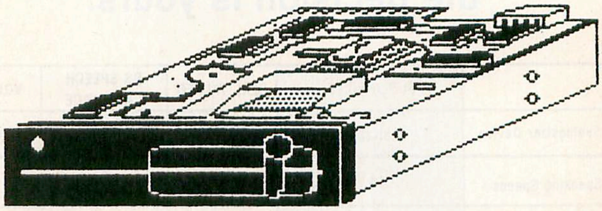
COCO ACCESSORIES





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Volume Levels	16	1	1	1
Articulation Rates	8	1	1	1
Vocal Tract Filter Settings	255	1	1	1
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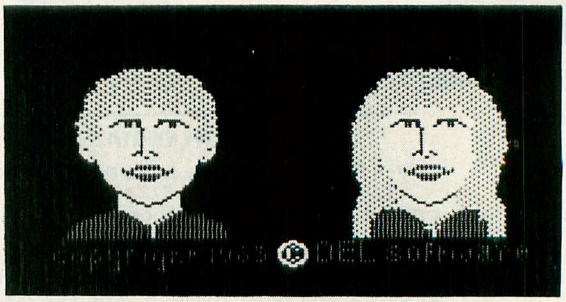

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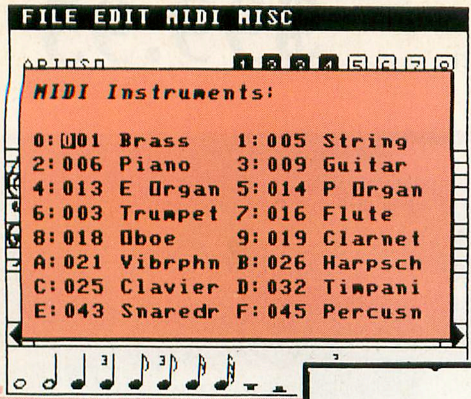

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MIDI Instruments:

0:001 Brass     1:005 String
2:006 Piano     3:009 Guitar
4:013 E Organ   5:014 P Organ
6:003 Trumpet   7:016 Flute
8:018 Oboe      9:019 Clarnet
A:021 Vibrphn   B:026 Harpsch
C:025 Clavier   D:032 Timpani
E:043 Snaredr   F:045 Percusn
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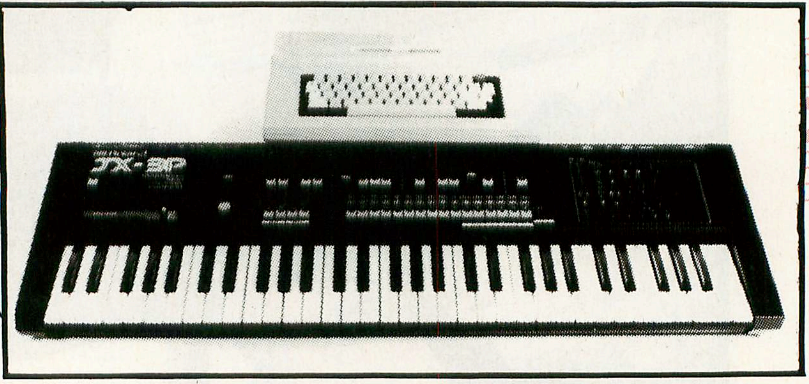

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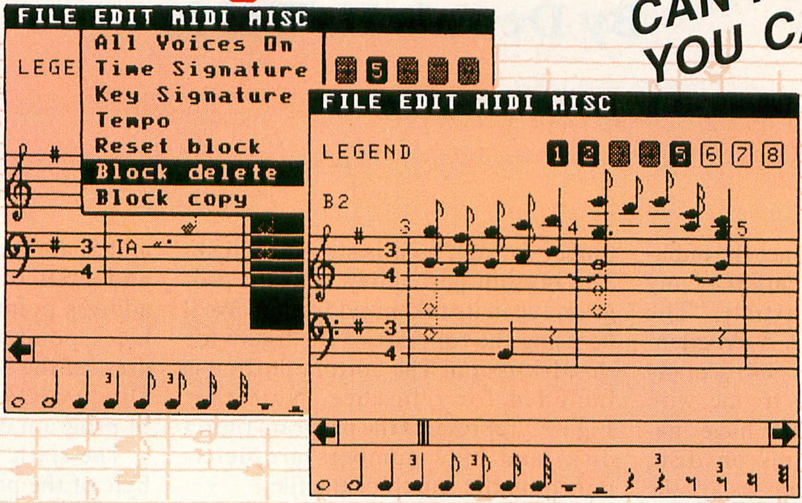

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Follow the Bread Crumbs

By Dennis H. Weide

Since the publication of my article "The CoCo Writes A Program" (July 1987, Page 84), many people have written to me with questions. Some say they have machine language programs on disk, but don't have the addresses of the programs. Well, believe it or not, Tandy left you some bread crumbs on disk (just like in the fairy tale) that will lead you to the addresses you want.

On cassette-based systems, the addresses are stored in RAM. Load the ML program into memory and use the following PEEK commands to find the required addresses:

```
Start Address
  PEEK(487)*256+PEEK(488)
End Address
  PEEK(126)*256+PEEK(127)
Exec Address
  PEEK(157)*256+PEEK(158)
```

Disk Extended BASIC doesn't store all the addresses in memory after loading the program. They're stored in the file on disk as shown in Figure 1. The top part of the figure shows a machine language program file in its binary format, as it is stored on disk. The bottom part shows a BASIC program file in its tokenized format. We'll be using the top part of the figure for this discussion. The bottom portion is included for reference. Note that Figure 1 represents the program file on disk, and byte numbers are determined by the length of the file.

The first byte (Byte 1) of an ML program file is always zero — this is how Disk BASIC determines whether the file specified in the LOADM command is a machine language program file. For a BASIC program, Byte 1 is always 255.

The second and third bytes (bytes 2 and 3) of the ML program file are the most significant byte (MSB) and least significant byte (LSB) of the file size. These two bytes tell Disk BASIC how many bytes of program code are actually stored in the file.

The fourth and fifth bytes (bytes 4 and 5) are the MSB and LSB of the start address pointer. These two bytes point to the start address of the ML program, where Disk BASIC will load the first byte of program code.

The sixth byte (Byte 6) is the first byte of the program code that will be loaded into the start address, indicated by the start address pointer.

Disk BASIC continues to load each successive byte into memory until it reaches the end of the program file. In Figure 1, the last byte of program code is Byte 11. The last five bytes (bytes 12 through 16) of an ML program file contain the end-of-program marker and the execute address. The fifth, fourth and third bytes (bytes 12, 13 and 14) from the end of the file always contain 255-0-0, indicating the end of the binary file.

Machine Language Program Disk Storage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PGM TYPE	PGM CODE SIZE		START ADDRESS		VARIABLE LENGTH PROGRAM CODE						END OF PRGM			EXECUTE ADDRESS	
ML=0	MSB	LSB	MSB	LSB	VAR	VAR	VAR	VAR	VAR	VAR	255	0	0	MSB	LSB

BASIC Program Disk Storage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PGM TYPE	NUMBER OF CODE BYTES		NEXT LINE POINTER		LINE NUMBER		VARIABLE LENGTH PROGRAM CODE						EOLN	EOF	
B=255	MSB	LSB	MSB	LSB	MSB	LSB	VAR	VAR	VAR	VAR	VAR	VAR	0	0	0

B	BASIC
EOF	END OF FILE MARKER
EOLN	END OF LINE MARKER
LSB	LEAST SIGNIFICANT BYTE
ML	MACHINE LANGUAGE
MSB	MOST SIGNIFICANT BYTE
VAR	VARIABLE BYTE VALUES
1-16	BYTE NUMBER

Figure 1: Disk file storage

Dennis Weide is a communications technician for AT&T in Albuquerque, New Mexico, where he programs AT&T and IBM PCs. He enjoys making toys and teaching computer programming.

The last two bytes (bytes 15 and 16) are the MSB and LSB of the execute address pointer. This is the address the processor jumps to when the program is executed from BASIC using the `EXEC` command or `USR` function. The programs in listings 1 and 2 follow the bread crumbs for you.

The program in Listing 1 is a BASIC program that prompts you for a filename and then reads the first byte of the file to determine if it's an ML program file. If it's not, the program jumps to Line 7000 and prints "Not a binary file." If it is an ML file, the program reads the file length in bytes 2 and 3 and the start address in bytes 4 and 5. Then it performs the following calculations to determine program size and the start, end, and execute addresses:

Program Size
`BYTE2 * 256 + BYTE3`
Start Address
`BYTE4 * 256 + BYTE5`
End Address
`START ADDR + PGM SIZE -1`
Exec Address
`(PGM SIZE + 9) * 256 + (PGM SIZE + 10)`

When all these calculations are complete, the results are printed on the screen in decimal and hexadecimal format. The last line, "Total bytes," is the program size — not the file size. The program size is always smaller than the file size, because the pointers and end-of-file (EOF) markers are not loaded into memory.

The program in Listing 2 is the PASCAL source code for the same program. It was written using Deft PASCAL and compiled into a machine language program. The addresses of the version provided for RAINBOW ON TAPE/DISK are as follows:

Function	**Dec**	**Hex**
Start Address	20000	4E20
End Address	24980	6194
Exec Address	20000	4E20

The ML code produced by the Deft compiler is fully relocatable, so you can load it into memory anywhere you want. It's always a good idea to protect memory where an ML program is loaded by using the `CLEAR` command.

Each version has its own advantages and disadvantages. The BASIC version will be erased from memory each time another BASIC program is loaded. But it can be appended to other BASIC disk utilities. The PASCAL version can be loaded into protected memory and executed whenever it's needed, but it executes slower than the BASIC version because PASCAL doesn't allow direct reading of disk tracks and sectors as BASIC does.

Both programs contain remarks to help you understand how they function, but it's not necessary to type in these remarks in either listing. After you've chosen the version you will use and have saved it to disk, you can test the program by entering the filename of an ML program stored on disk for which addresses are known. Be sure to include the drive name in the filename if you have more than one drive. You can create a dummy test file by entering the following:

```
SAVEM"JUNK/BIN:0",5000,6000,
5500
```

This is not a working program but a dummy file to verify that your program works properly, so be sure to kill it after you've completed the test. When you enter `JUNK/BIN:0` at the filename prompt, the following screen message should be displayed:

```
JUNK/BIN:0

FUNCTION             DEC      HEX
START ADDRESS       5000     1388
END ADDRESS         6000     1770
EXEC ADDRESS        5500     157C
TOTAL BYTES         1001     03E9
```

If other addresses are displayed, check the program for typing errors.

The information I've provided here should come in handy for those who want to expand their programming knowledge or better understand how files are stored on disk. This information applies to Radio Shack Disk Extended Color BASIC versions 1.0 and 1.1, and any RS-DOS compatible operating system. It will not work on OS-9 operating systems.

It's always a pleasure to hear from people who find my articles interesting. So, if you have any questions or suggestions, please feel free to write me.

(You may write to Dennis Weide at 14201 Marquette N.E., Albuquerque, NM 87123. Please enclose an SASE when requesting a reply.) ☐

Listing 1: `ADRESBAS`

```
100 '      FINDADDR PROGRAM
200 '      BY DENNIS H. WEIDE
300 '
400 '      THIS PROGRAM WILL READ
500 '      THE START, END AND EXE
C
600 '      ADDRESSES OF AN ML PRO
GRAM
700 '      FROM DISK AND PRINT TH
E
800 '      RESULTS ON THE SCREEN
900 '
1000 '
1100 CLS
1200 LINEINPUT"ENTER FILENAME >
";F$
1300 CLS
1400 '
1500 '    OPEN FILE TO READ
1600 '    A BYTE AT A TIME
1700 '
1800 OPEN "D",#1,F$,1
1900 FIELD #1,1 AS A$
2000 '
2100 '    READ FIRST BYTE TO
2200 '    SEE IF FILE IS AN
2300 '    ML BINARY FILE
2400 '
2500 GET #1,1
2600 IF ASC(A$)>0 THEN 7000
2700 '
2800 '    READ BYTES 4 AND 5
2900 '    AND CALCULATE THE
3000 '    START ADDRESS
```

```
3100 '
3200 GET #1,4
3300 SA=ASC(A$)*256
3400 GET #1,5
3500 SA=SA+ASC(A$)
3600 '
3700 '     READ BYTES 2 AND 3 AND
3800 '     CALCULATE PROGRAM SIZE
3900 '
4000 GET #1,2
4100 PS=ASC(A$)*256
4200 GET #1,3
4300 PS=PS+ASC(A$)
4400 '
4500 '     CALCULATE END ADDRESS
4600 '
4700 EA=SA+PS-1
4800 '
4900 '     LOCATE LAST TWO BYTES
5000 '     OF FILE AND CALCULATE
5100 '     EXECUTE ADDRESS
5200 '
5300 GET #1,PS+9
5400 EX=ASC(A$)*256
```

```
5500 GET #1,PS+10
5600 EX=EX+ASC(A$)
5700 CLOSE#1
5800 '
5900 '     PRINT RESULTS TO SCREEN
6000 '
6100 PRINT F$
6200 PRINT
6300 PRINT "FUNCTION          DEC
     HEX"
6400 PRINT "-------------------
     -------"
6500 PRINT "START ADDRESS        ";SA
     ;" ";HEX$(SA)
6600 PRINT "END ADDRESS          ";EA
     ;" ";HEX$(EA)
6700 PRINT "EXEC ADDRESS         ";EX
     ;" ";HEX$(EX)
6800 PRINT "TOTAL BYTES          ";EA
     -SA+1;" ";HEX$(EA-SA+1)
6900 END
7000 PRINT F$:PRINT:PRINT "NOT A
     BINARY FILE"
```

Listing 2: ADRESPAS

```
PROGRAM FINDADDR(INPUT,OUTPUT);

(*          WRITTEN BY DENNIS H. WEIDE          *)
(* PROGRAM TO FIND START, END, & EXEC ADDRESS *)
(* OF MACHINE LANGUAGE PROGRAM. TRS-80 COCO    *)

(* DECLARE ALL VARIABLES  *)

VAR FILENAME,ADDRESS1,ADDRESS2,ADDRESS3,ADDRESS4:STRING;
    FILE1:TEXT;
    BITE1,BITE2,BITE3:CHAR;
    PGMSIZE,START,FINISH,EXEC,COUNT:INTEGER;

 (* START OF MAIN PROGRAM *)

BEGIN
  PAGE;
  WRITE('ENTER FILENAME > ');
  READLN(FILENAME);
  PAGE;

 (* OPEN FILE TO BE READ *)
 (* ONE BYTE AT A TIME    *)

  RESET(FILE1,FILENAME);

 (* READ BYTES 1,2,3 TO SEE *)
 (* IF THIS IS AN ML BINARY *)
(* FILE.                   *)

  READ(FILE1,BITE1,BITE2,BITE3);

(* IF THIS IS AN ML BINARY *)
(* FILE, START HERE TO     *)
(* CALCULATE PROGRAM SIZE  *)

  IF BITE1=CHR(0) THEN BEGIN
    PGMSIZE:=ORD(BITE2)*256+ORD(BITE3);

(* READ BYTES 3 AND 4 AND  *)
(* CALCULATE START ADDRESS *)

    READ(FILE1,BITE1,BITE2);
    START:=ORD(BITE1)*256+ORD(BITE2);

(* CALCULATE END ADDRESS   *)

    FINISH:=START+PGMSIZE-1;

(* READ ALL BYTES UNTIL THE *)
(* LAST TWO FILE BYTES ARE  *)
(* FOUND.                   *)

    FOR COUNT:=1 TO PGMSIZE+3 DO READ(FILE1,BITE1);

(* READ LAST TWO FILE BYTES *)
(* AND CALCULATE EXECUTE    *)
(* ADDRESS.                 *)

    READ(FILE1,BITE2,BITE3);
    WRITELN;
    EXEC:=ORD(BITE2)*256+ORD(BITE3);

(* COMPUTE ALL HEXIDECIMAL  *)
(* ADDRESSES.               *)

    WORD[1024]:=START;
    HEX(1024,2,ADDRESS1);
    WORD[1024]:=FINISH;
    HEX(1024,2,ADDRESS2);
    WORD[1024]:=EXEC;
    HEX(1024,2,ADDRESS3);
    WORD[1024]:=PGMSIZE;
    HEX(1024,2,ADDRESS4);

(* PRINT RESULTS TO SCREEN  *)

    PAGE;
    WRITELN(FILENAME);
    WRITELN;
    WRITELN('FUNCTION         DEC     HEX');
    WRITELN('-----------------------------');
    WRITELN('START ADDRESS  ',START,'   ',ADDRESS1);
    WRITELN('END ADDRESS    ',FINISH,'   ',ADDRESS2);
    WRITELN('EXEC ADDRESS   ',EXEC,'   ',ADDRESS3);
    WRITELN('TOTAL BYTES    ',PGMSIZE,'    ',ADDRESS4)
  END
  ELSE WRITELN('NOT A BINARY FILE');
END.
```

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PLEASE CIRCLE
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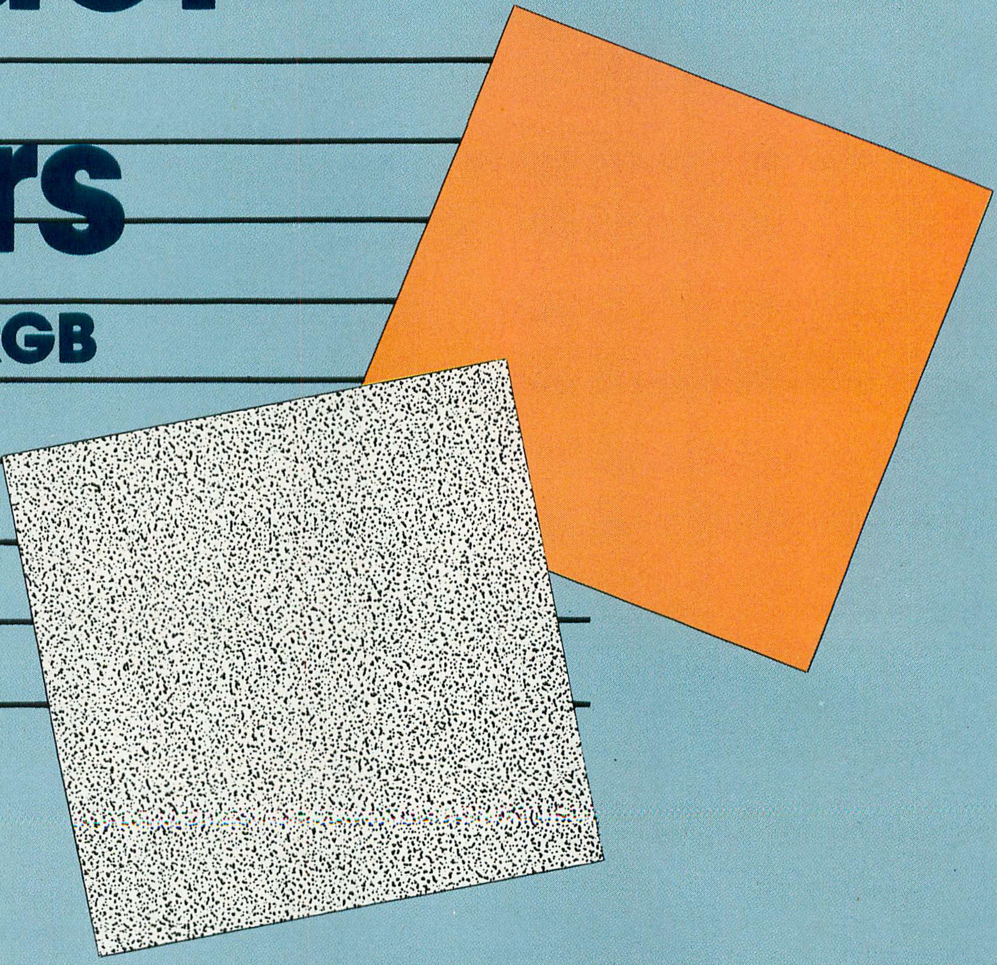
A patch to display CoCo 1 and 2 colors on the CM-8 monitor

Artifact Colors

on CoCo 3's RGB

By Steven M. Ostrom



Because of all the concern over artifact colors not being displayed on the CM-8 monitor when the CoCo 3 runs older machine language programs, I decided to create *Patch*. This BASIC program, along with its three machine language subroutines, helps display color on the CM-8 monitor.

Patch modifies the existing machine language program that uses artifact colors, searching the program for all occurrences of the sequence FF22. It then checks to see if the STA or STB commands precede this reference to the PIA register. If so, *Patch* then inserts a call to a small routine placed in upper memory that checks to see if the PMODE being attempted is either 2 or 4.

What this routine does is change the PMODE to either 1 or 3, which will let you see the game in full color. The graphics may appear slightly coarser, though. The program is not foolproof. It works in most cases, but sometimes the patch just won't work. In a few instances, however, when it appeared to fail, a press of the reset button started everything up and the program ran fine with color.

Patch is self-explanatory. Just load it and run. It first initializes the proper color slots for the RGB monitor and sets up the machine language routines.

Steve Ostrom is a 38-year-old father of two girls who love the CoCo. He has written numerous programs, including the Adventure SHIPWREK, *the ML game* STYX, *and a variety of BASIC games and utilities, both commercial and in the public domain.*

You are then told to load your artifacting machine language program (do not type EXEC), and to type GOTO 290. You will be prompted to press the ENTER key, and you might notice three values displayed briefly in the upper left-hand corner of the screen. These are the number of occurrences found in the ML program of a possible PMODE change.

The value next to the question marks represents the occurrences of references to $FF22, without either STA or STB just prior. These may need to be examined further using the *Look* program. *Patch* modifies all occurrences of STA and STB whenever PMODEs 2 and 4 are called. You must do this every time you want to load an ML program.

Patch will not work if the programmer did some unusual things while setting up the PMODE screens. Also, it won't work on BASIC programs, copy-protected programs or ROM packs. It works only on machine language programs that load between &H1900 and &H7FE0. This is a range large enough that it should include most programs.

My second program to help in artifacting colors for RGB monitors is *Look*. It's a BASIC program that scans machine language programs and prints out the locations of all possible writes to Register $FF22. You can examine these locations in more detail with an editor/assembler/debugger utility.

If you are proficient in using a debugging utility such as *ZBUG*, you can also make permanent changes to many machine language programs that work with *Patch*. When you find the areas that store a number into $FF22, just replace this number with the same number ANDed with &HEF. This sets Bit 4 of Register $FF22 to zero, and changes the PMODE from 4 to 3 or from 2 to 1. All you need to do then is save this copy. It will now always run with color on your CM-8 without needing to run *Patch* each time.

(Questions or comments regarding this program may be directed to the author at 12612 Cedar Lake Road, Minnetonka, MN 55343. Please enclose an SASE when requesting a reply.)

Editor's Note: The following machine language programs from T & D Subscription Software have been tested with Patch *to display colors when run on a CoCo 3 and CM-8 monitor:* Panzer, Mrs. Pac, Foot Racer, Raider, Fire Runner, Flippy *and* Able. *If you find other ML programs to work properly with* Patch, *please send us a list of the program names, along with the companies presently selling the program. We will print updated lists for our readers in upcoming issues.* ☐

Listing 1: PATCH

```
 10 'PATCH
 20 'COPYRIGHT 1987
 30 'STEVE OSTROM
 40 '12612 CEDAR LAKE ROAD
 50 'MINNETONKA, MN 55343
 60 '612-546-7608
 70 '
 80 PCLEAR1
 90 CLEAR14,&H1900
 100 RGB
 110 PALETTE 4,0
 120 PALETTE 5,9
 130 PALETTE 6,36
 140 PALETTE 7,63
 150 FORX=&H7FE0 TO &H7FE9
 160 READA$
 170 POKEX,VAL("&H"+A$)
 180 NEXTX
 190 FORX=&H7FF0 TO &H7FF9
 200 READA$
 210 POKEX,VAL("&H"+A$)
 220 NEXTX
 230 FORX=&H7F70 TO &H7FDB
 240 READA
 250 POKEX,A
 260 NEXTX
 270 CLS:PRINT"NOW LOADM YOUR ML
PROGRAM.":PRINT:PRINT"WHEN DONE,
 TYPE:                GOTO 290"
 280 END
 290 A=PEEK(&H9D)*256+PEEK(&H9E)
 300 CLS:PRINT"LDA=":PRINT@32,"LD
B=":PRINT@64,"???="
 310 PRINT:INPUT"PRESS <ENTER>";A
$
 320 EXEC&H7F70
330 PRINT:INPUT"PRESS <ENTER> TO
 START PROGRAM";A$
340 EXECA
350 DATA 81,C0,25,05,84,EF,B7,FF
,22,39
360 DATA C1,C0,25,05,C4,EF,F7,FF
,22,39
370 DATA 134,48,167,141,0,43,167
,141,0,40,167,141,0,37,142,25,0,
141,33,16,174,128,140,127,112,39
,46,16,140,255,34,38,240,166,30,
```

Hint . . .

Taking Care of CoCo 3 Bugs

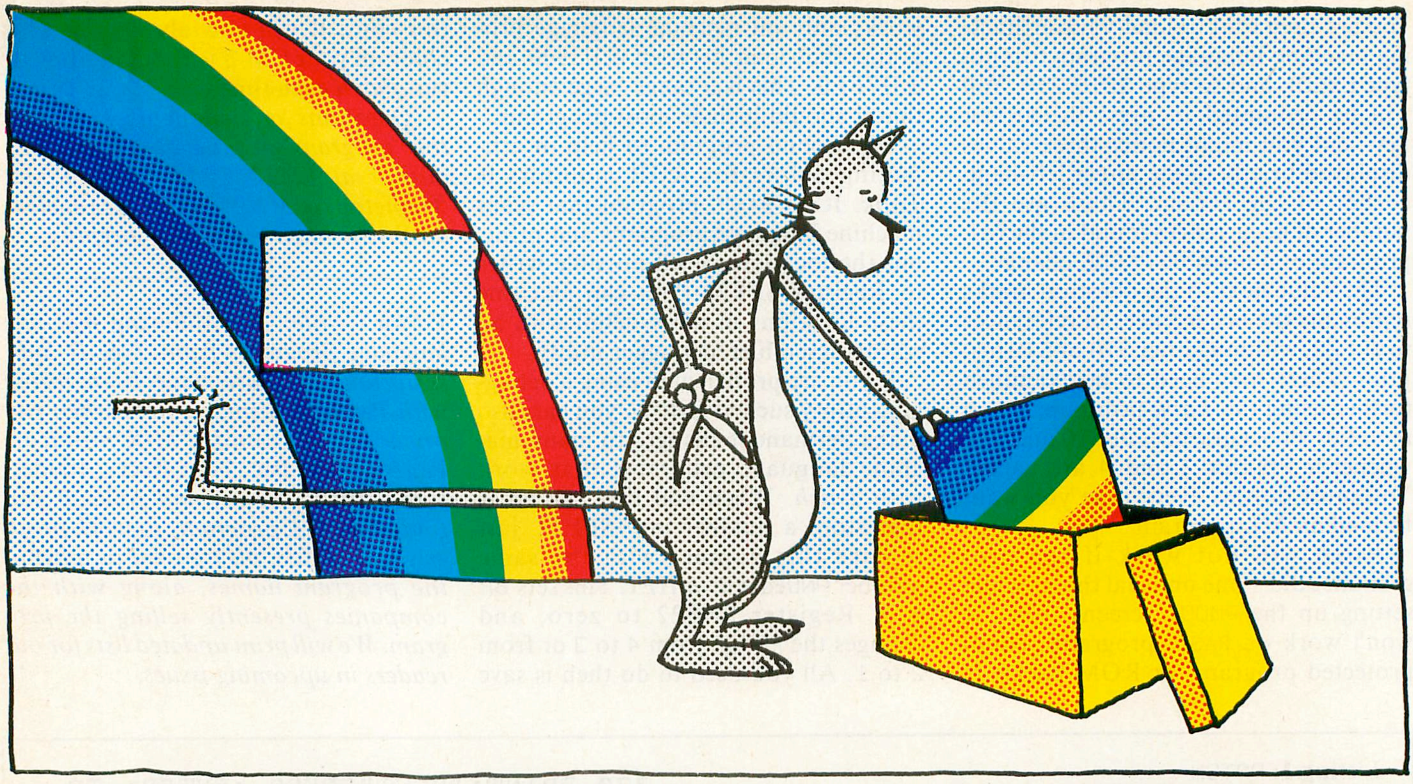
In theory, when you specify a value greater than 23 and less than 256 to the vertical coordinate of the HPRINT command, the CoCo 3 BASIC should draw the characters on Line 23 on the screen (the bottom line). In practice, however, a value greater than 23 but less than 127 causes BASIC to draw the characters on the first (top) line. Further, when the value is greater than 151 (which, by the way, is equal to 128+23), the characters are drawn right off the displayed screen, causing BASIC to crash randomly.

What is happening is that BASIC is taking the entered eight-bit value and performing a signed comparison on it to determine whether or not it is lower than the maximum allowable value. As a result, any integer greater than 127 is considered negative and, therefore, passes the range test. When the value goes over 151, BASIC starts to draw the characters into the RAM space reserved for BASIC code, which causes the system to crash.

The solution to this problem is simple: Convert the signed comparison to an unsigned comparison. To do this, just issue POKE&HEF92, &H24 from BASIC.

See Pg14, APR88 RB
For Correction to above.

Roger Bouchard
(HARBIE)
Montreal, Quebec



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```
129,183,39,35,129
380 DATA 247,39,48,108,141,0,4,3
2,224,255,255,255,166,141,255,24
9,183,4,4,166,141,255,243,183,4,
36,166,141,255,237,183,4,68,57,1
34,189,167,30,16,142
390 DATA 127,224,16,175,31,108,1
41,255,216,32,182,134,189,167,30
,16,142,127,240,16,175,31,108,14
1,255,200,32,165,999
```

Listing 2: LOOK

```
10 'LOOK
20 'COPYRIGHT 1987
30 'STEVE OSTROM
40 '12612 CEDAR LAKE ROAD
50 'MINNETONKA, MN 55343
60 '612-546-7608
70 '
80 PCLEAR1
90 CLEAR14,&H1900
100 RGB
110 PALETTE 4,0
120 PALETTE 5,9
130 PALETTE 6,36
140 PALETTE 7,63
150 CLS:PRINT"LOADM THE PROGRAM
TO TEST":PRINT:PRINT"THEN TYPE:
  GOTO 160":STOP
160 CLS
170 DA=0
180 DB=0
190 DC=0
200 FORX=&H36AD TO &H3E0A
210 PRINT@0,HEX$(X)
220 A=PEEK(X)
230 IFA<>&HFF THEN380
240 A=PEEK(X+1)
250 IFA<>&H22 THEN380
260 A=PEEK(X-1)
270 IFA=&HB7 THEN320
280 IFA=&HF7 THEN350
290 DC=DC+1
300 PRINT#-2,HEX$(X);"  ???"
310 GOTO380
320 DA=DA+1
330 PRINT#-2,HEX$(X);"  LDA"
340 GOTO380
350 DB=DB+1
360 PRINT#-2,HEX$(X);"  LDB"
380 NEXTX
390 CLS:PRINT"LDA=";DA:PRINT#-2,
"LDA=";DA
400 PRINT"LDB=";DB:PRINT#-2,"LDB
=";DB
410 PRINT"???=";DC:PRINT#-2,"???
=";DC
```

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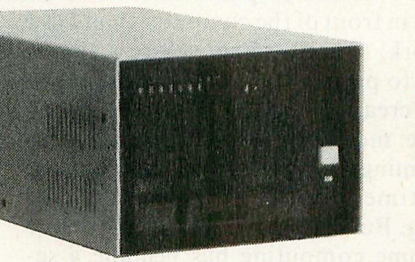

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The hazards of spending long hours at the computer

A Healthy Interface

Body Maintenance and Computing

By Laurence D. Preble

What began as a trickle in the late '70s has now become a flood. I'm talking about the increasing flow of patients who come to me with complaints directly attributable to long hours spent in front of a computer.

At first, "computer casualties" came mainly from the work place. But more and more often now I see problems stemming from long hours of computing in the home.

I admit it. There have been occasions when I actually spent more time at home in front of the computer than I did at work. (Thanks, Peg, you're a sweetheart to put up with it all.) Some of my most creative work comes at 2 o'clock in the morning. Those "simple" programming problems always take at least five times longer than expected to debug. But I am not the only guilty one — home computing has become a serious business.

Laurence D. Preble, D.C., a graduate of Vanderbilt University and Logan College of Chiropractic, has been a practicing chiropractor since 1978 and an avid computer programmer since 1969. He built his first computer in 1976. The Radio Shack Color Computers have been his favorite home computers since 1982.

The consequences of long hours at the computer are also serious business. Essentially, computing stresses three systems: the *eyes*, the *spine* and the *nervous system.*

The Eyes

Perhaps the best-known consequence of long computing sessions is eye strain. Some display devices are notoriously hard to read. Many LCD Screens (*Liquid Crystal Displays*) fit this category. Computers that use a TV as a display device can also strain the eyes if the characters displayed are too small.

Several popular programs for the CoCo try to squeeze up to 85 columns of characters across and 24 lines down a TV screen! The problem is that TV sets and even *composite video monitors* have very limited resolution capacities. If more than 40 columns of characters are displayed across the screen, the letters and numbers begin to blur. CoCo 3 circumvents this problem by allowing the use of a high resolution *RGB monitor.* Good quality RGB monitors easily handle 80 columns across and 24 or more lines down the face of the tube, even displayed in color.

If it is necessary to use composite video, a high resolution monochrome monitor will give the best results for text-oriented applications.

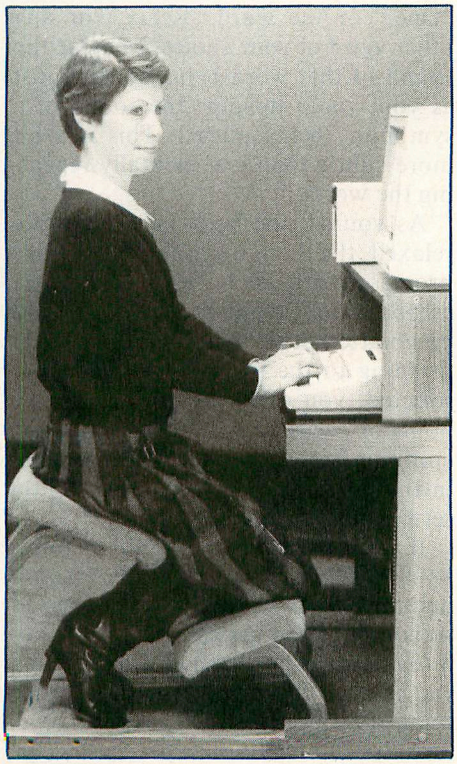
If the only display device available is the venerable television set, here are a few actions you can take to reduce the chance of eye strain: Limit the display to 40 characters across and no more than 16 lines down. If you want to push this limit a bit, turn the color control on the TV all the way down so that the display is black and white. By removing the color (or by using a black-and-white TV), you will notice that the text display appears sharper. With a very good TV set, you may be able to display up to 51-by-24 characters with relative viewing ease.

Inadequate lighting can also play a role. Computing usually involves reading, from both a VDT and hard copy, or paper printouts. The lighting in the work area should be bright enough to provide good contrast when reading paper printouts. If the display device is an LCD screen, the lighting is vitally important as the screen emits no light of its own. More commonly, a CRT (*Cathode Ray Tube*) is used as a display device. It is important to shield this kind of display from too much light. Light reflected from the CRT can decrease contrast or wash out the display and also produce a distracting glare. Glare shields and proper arrangement of the lighting can help.

Some recent visual research has suggested another potential problem. It appears that hour upon hour of reading provides inadequate stimulation to the peripheral vision (side vision). The fovea centralis (center area of vision on the retina) is, however, highly stimulated by reading. The consequences of this limited stimulation actually affects the growth of the eye! The eye lengthens and causes light to be focused in front of the retina rather than precisely on its surface, resulting in myopia or nearsightedness. Have you ever noticed that people who are avid readers seem to wear glasses more often than not? There is a developing body of evidence to lend credence to this observation.

Unfortunately, the studies I read merely reported their findings without recommending any solutions to the problem. Until more research is completed, we are left with "common sense" suggestions. So take frequent breaks from reading and computing. A walk outdoors provides excellent peripheral vision stimulation and is a wonderful stress reducer, as well.

It is best to act quickly if you discover any visual problems. Consult a vision specialist on a regular basis. Your optometrist or ophthalmologist may have specific suggestions for reducing eye strain during your long hours at the keyboard.



The seat of this kneeling chair tips the pelvis forward to help maintain good sitting posture.

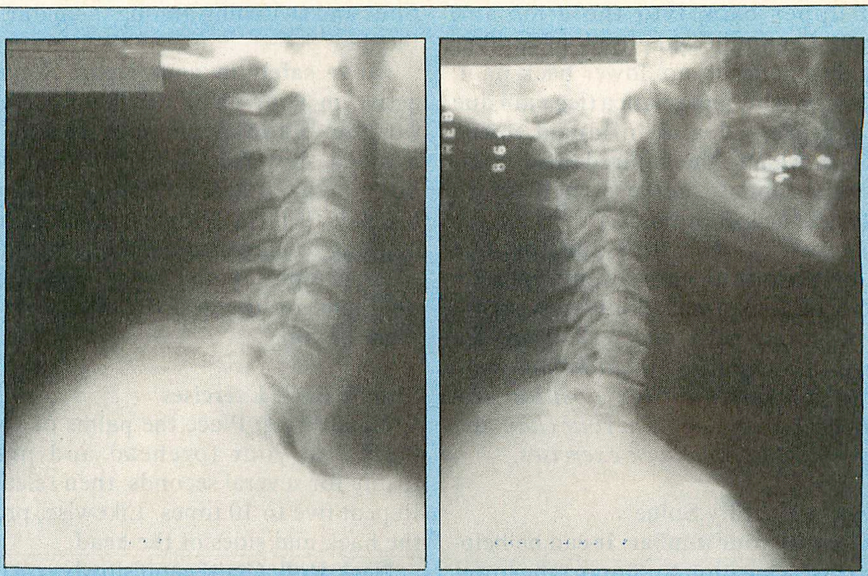


Photo 1 **Photo 2**

Photo 1 shows the natural curve of the cervical spine. Photo 2 shows degeneration of cervical discs and vertebrae (spondylosis) due to poor posture.

The Spine

Computing normally requires a sitting posture, a position that can have serious consequences for your back and neck. The quality of your sitting posture can affect your computing endurance and, ultimately, your health. Often, 40 hours of sitting puts more strain on the spine than 40 hours of standing.

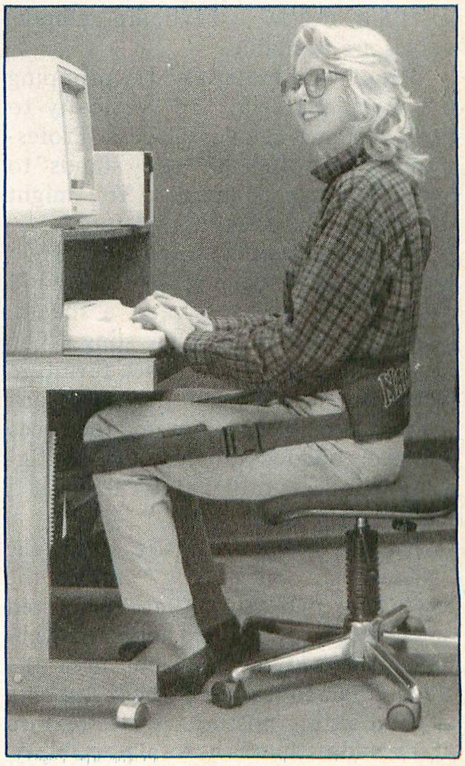
Good sitting posture supports the three natural curves of the spine (*cervical, thoracic* and *lumbar*) in their normal, balanced alignment. When you slouch, the induced strain can lead to stiffness, backache, muscle fatigue, headache and even degenerative changes. The lumbar curve (lower back) bears most of the strain of sitting and requires the most support.

Vertebrae are the bones of the spine that provide a framework and protection for the spinal nerves. *Discs* are the pads of cartilage between vertebrae and act primarily as cushions for the vertebrae. *Ligaments* act like very strong rubber bands, connecting and stabilizing the vertebrae. The muscles of the back and abdomen help maintain the natural curves of the spine.

Slouching greatly alters the natural alignment of the spine. With postural muscles no longer doing their work, ligaments take up the load, becoming overstretched. This leads to stiffness, fatigue and backache.

Even more serious is the compression of discs resulting from poor sitting posture. When the spine curves forward, pressure within the discs soars. Years of poor posture often lead to a gradual deterioration of the lower cervical (neck) discs and of the lower lumbar (lower back) discs.

A common result of cervical disc degeneration is a mixture of pain, numbness and tingling in the neck, shoulder, arms and hands, due to compression of the network of nerves (brachial plexus) leading from the neck



The "Nada-Chair Back Sling" cradles the lowerback in a "sling" that is anchored at the knees by padded loops of webbing.

and upper back into the arms and hands. Common symptoms of lumbar disc degeneration are lower back pain, muscle spasms and sciatica (leg pain due to compressed and inflamed nerve roots). Again, the injured disc compresses delicate nerve structures to produce the symptoms.

Spinal degeneration due to poor sitting posture is entirely preventable. There are four simple things you can do to save your back and neck from the rigors of computing: *maintaining good sitting posture, shifting position frequently, moving safely in your chair* and *performing simple back exercises.*

Rx for a Healthy Spine

Support your lumbar: It can be helpful to use a cushion to support the lower back — a towel rolled to about 6 inches in width or a premade support can fit the bill. Alternately, a seat wedge that tips the pelvis forward can help to restore the lumbar curve; you may either sit on a folded towel a few inches thick or use a premade seat wedge.

Sit close to your work: Keep your chair close to the desk so that you won't strain to reach your work materials. Also, a detachable keyboard can go a long way towards alleviating back strain while computing. When the keyboard is movable, you can select the ideal position for typing. Check the ads in THE RAINBOW — keyboard extender cables are available.

"Prop" your materials: Try propping the work materials up vertically to prevent slumping over the desk. Professional typists often use "copy stands" to hold their papers upright. You might find one at an office supply store.

Use special support helpers: I use two special devices to help maintain good posture for the long haul: a special kneeling chair and a "back sling." The chair is available from office furniture stores. The seat tips your pelvis forward with the legs placed below and the knees are given padded support. The configuration appears rather unusual, but it is really quite comfortable.

The other support device, called the "Nada-Chair Back-Sling" cradles the lower back in a "sling" that is anchored at the knees by padded loops of webbing. The Mayo Clinic has used the Nada-Chair to train their back patients in good sitting posture. A nice feature of the Nada-Chair is its total portability. It can be taken camping, even canoeing.

Shift position frequently: You can diminish the strain and fatigue of sitting by finding a few alternate sitting positions and switching among them during the day.

Move safely in your chair: Staying active in your chair can help prevent fatigue. Sudden motion should be avoided, however. When turning the body, avoid sudden twisting motions; instead, turn the body as a unit. When bending to pick up something from the floor, support your upper body with one hand on the desk and one foot in front of you.

Simple Back Exercises

Head Press: Place the palms of your hands on your forehead and press firmly for several seconds, then release. Repeat five to 10 times. Likewise, press the back and sides of the head.

Neck Roll: Gently and slowly roll the neck in circles, pausing at places where you feel tension. Breathe deeply to help release the tension. Roll to the left and right alternately. Go slowly! Repeat five to 10 times.

Shoulder Shrug: Bring the shoulders to the ears and press tightly. Release gradually. Next, press shoulders down firmly. Release. Work the shoulders forward and backward in a circular motion. Repeat five to 10 times.

Mid-back Press: With your arms at your side, clasp your hands behind you. Push backward while inhaling deeply to expand the chest. You should feel as if you are pressing your shoulder blades together behind you. Repeat five to 10 times.

Mid-back Stretch: Press one arm above your head, one arm down behind your back. Keep both elbows bent. Try to touch your ear with the upper arm. Stretch and then release. Repeat five to 10 times.

Lower Back Stretch: Stand upright. Place the palms of your hands on your lower back for support. Gently and slowly bend backward. Stretch for a moment and then release. Repeat five to 10 times.

Abdominal Strengthener: Sit straight with your posterior firmly against the back of the chair. Exhale and tighten your abdominal muscles for a count of 10. Release and repeat five to 10 times.

Years of personal experience have shown that it is far easier to prevent back problems than it is to treat them once an injury has occured. Take the time to develop good habits of spinal hygiene.

The Nervous System

Computing is, of course, a thought-intensive activity. And, while completing a successful computing project is rewarding and satisfying, the process of programming and debugging can be extremely stressful and frustrating.

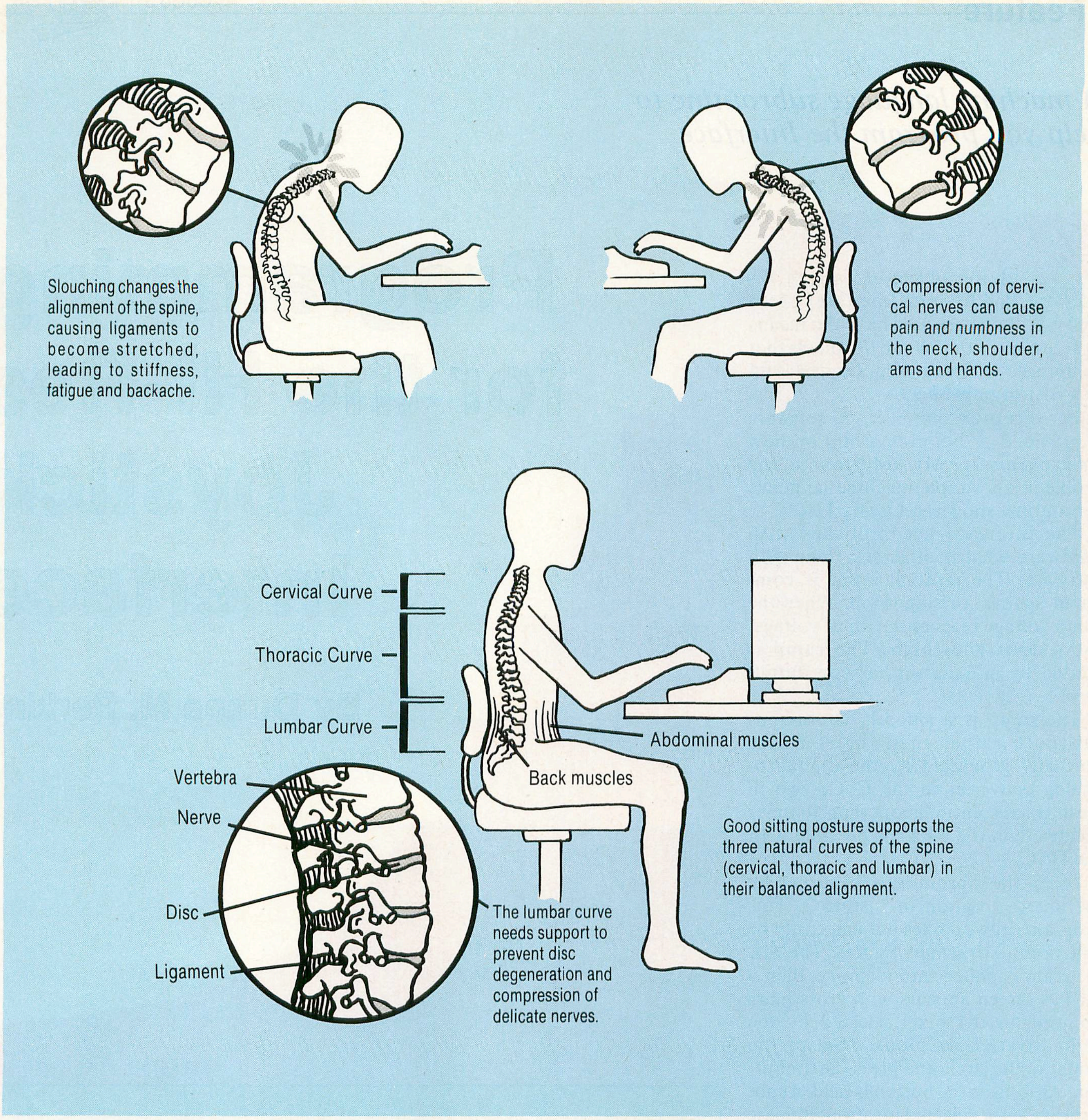
There is a growing body of knowledge indicating the harmful effects of too much stress. Just recently I heard about some research concerning the immune system. It was determined that high levels of stress produce a hormone called A.C.T.H. (Adrenocorticotropic Hormone, also known as Corticotropin). This hormone, in turn, depresses the functioning of the immune system. In other words, too much stress can get you an infection for your trouble. I can believe it. I used to catch the "flu" with great regularity around final exam time in college. (It helps to do your studying in advance rather than try to cram the night before the exam.) I survived the "flu bugs" during eight years of college — now I have to watch out for "Compu-Crud"!

I have found it useful to take occasional breaks to practice what some researchers call the "Relaxation Response." A simple method of focusing the attention can result in reduced stress and enhanced function. To use the "response," sit in an upright posture with the eyes closed and turned gently upward. But do not force them upward. Select a word of your choice to act as a point of focus. It could be the word "One," or the word "Relax," or any other word of your choice. Imagine the sound of that word being spoken, just as you would imagine the sound of a symphony being played. This is a bit more subtle than just mentally repeating the word.

As you sit, the body becomes more relaxed, the thoughts more subtle. This process is not an attempt at fantasy, escape or self-hypnosis — there should be no attempt to "blank" the mind. By listening to the inner sound you have selected, you offer the mind a simple point of focus. Random thoughts will continue for a time, but become less intrusive. If the mind wanders, gently return to your point of focus.

If you sit like this for several minutes, your brainwaves will become smooth and regular. If an EEG were connected to you, it would indicate brainwaves of 8 to 13 cycles per second, a state called the *Alpha Rhythm*, associated with relaxed awareness.

Allow this restful state to continue for 15 to 20 minutes. There is no need to time the session — your body clock will let you know when enough time has elapsed.


Slouching changes the alignment of the spine, causing ligaments to become stretched, leading to stiffness, fatigue and backache.
Compression of cervical nerves can cause pain and numbness in the neck, shoulder, arms and hands.
Cervical Curve
Thoracic Curve
Lumbar Curve
Abdominal muscles
Back muscles
Vertebra
Nerve
Disc
Ligament
Good sitting posture supports the three natural curves of the spine (cervical, thoracic and lumbar) in their balanced alignment.
The lumbar curve needs support to prevent disc degeneration and compression of delicate nerves.

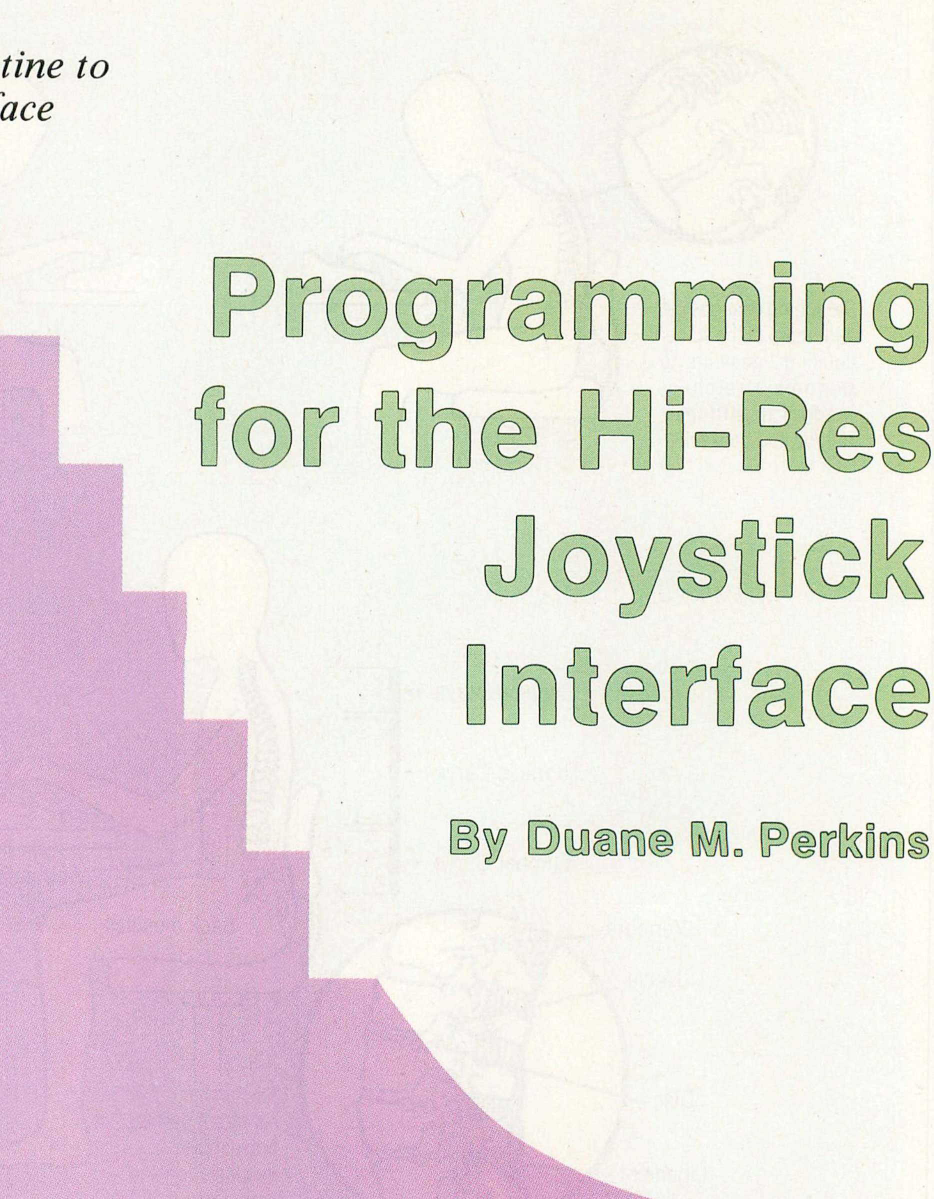
A *biofeedback* instrument can be useful in early training for achieving the Relaxation Response. Radio Shack sells a simple device for measuring the *Galvanic Skin Response*, which operates on the relationship of the electrical resistance of the skin to the amount of stress in the system. The Radio Shack Biofeedback Monitor (Cat. No. 63-675) takes readings of skin resistance and converts them into a variable pitch tone. The more relaxed you become, the lower the pitch of the tone. (The same principles are used in a polygraph or "lie detector" test.)

Reams of information have been written on relaxation. It is certainly not new, and the benefits are many. People who practice in this way on a regular basis are found to have much lower levels of stress in their bodies. Their ability to concentrate is improved. Even high blood pressure can be reduced through relaxation techniques.

Over the years I have come to think of the computer as an extension of me, a sort of "mind amplifier." With the advent of room temperature superconductors, it is quite possible that our future will bring computers so small, yet so capable, that they can be worn as jewelry and controlled by voice or even by brainwave interpretation. Until that time arrives, we must put up with an imperfect human-to-computer interface. Also, like any mechanical device, our bodies, too, must be carefully maintained.

(Questions or comments regarding this article may be directed to the author at 6540 Outer Loop, Louisville, KY 40228. Please enclose an SASE when requesting a reply.)

A machine language subroutine to help you program the Interface



Programming for the Hi-Res Joystick Interface

By Duane M. Perkins

With the advent of Tandy's Hi-Res Joystick Interface, CoCo 3 owners now have the means to access *all* of the 640 by 192 pixels that comprise a Hi-Res graphics screen, and at a cost of only $9.95.

For this price, however, no software is provided — not even a hint on how to program it. My solution to the problem is a simple machine language subroutine, shown in Listing 1.

The interface accomplishes with hardware what is otherwise done with software. The joystick input is compared against a rising ramp. When the ramp voltage reaches the input voltage, the output goes high. The ramp is started by making the cassette output low.

The ramp is a smooth, continuous sawtooth rather than the staircase normally generated by the digital-to-analog converter in the CoCo, which permits a resolution more than 10 times greater than the 64 steps possible with the DAC.

Use of the subroutine is illustrated by the BASIC program in Listing 2. This program draws circles but can easily be enhanced to draw any figures. The ML program is poked into memory, then a Hi-Res screen appears with cross hairs pointing to the pixel selected by the right joystick or mouse. Select the center of the circle and press the firebutton. As long as the button is held, a spot appears at the selected location. Release the button and select any point on the circumference. Press the button again and the circle will be drawn.

(Questions or comments about this program may be directed to the author at P.O. Box 255, Mt. Gretna, PA 17064. Please enclose an SASE when writing for a reply.) □

Duane M. Perkins retired as director of management information systems at the Panama Canal and lives in Mt. Gretna, Pennsylvania. He has had a number of articles published in Modern Electronics *and operates an OS-9 BBS at 717-964-3161.*

Listing 1

```
7F00                    00100          ORG    $7F00
7F00 B7     FFD9        00110 ENTER    STA    $FFD9
7F03 BD     B3ED        00120          JSR    $B3ED
7F06 4F                 00130          CLRA
7F07 5D                 00140          TSTB
7F08 27     02          00150          BEQ    SKIP1
7F0A 86     08          00160          LDA    #8
7F0C B7     7F74        00170 SKIP1    STA    PARAM
7F0F B6     FF01        00180          LDA    $FF01
7F12 84     F7          00190          ANDA   #$F7
7F14 BA     7F74        00200          ORA    PARAM
```

```
7F17 B7     FF01     00210            STA     $FF01
7F1A B6     FF03     00220            LDA     $FF03
7F1D 84     F7       00230            ANDA    #$F7
7F1F B7     FF03     00240            STA     $FF03
7F22 8D     2E       00250 LOOP1      BSR     SUBR
7F24 BF     7F75     00260            STX     SAVE
7F27 8D     29       00270            BSR     SUBR
7F29 BC     7F75     00280            CMPX    SAVE
7F2C 26     F4       00290            BNE     LOOP1
7F2E 1F     10       00300            TFR     X,D
7F30 83     0001     00310            SUBD    #1
7F33 7D     7F74     00320            TST     PARAM
7F36 27     0D       00330            BEQ     SKIP2
7F38 44              00340            LSRA
7F39 56              00350            RORB
7F3A 1083 00BF       00360            CMPD    #191
7F3E 2F     0E       00370            BLE     SKIP3
7F40 CC     00BF     00380            LDD     #191
7F43 20     09       00390            BRA     SKIP3
7F45 1083 027F       00400 SKIP2      CMPD    #639
7F49 2F     03       00410            BLE     SKIP3
7F4B CC     027F     00420            LDD     #639
7F4E BD     B4F4     00430 SKIP3      JSR     $B4F4
7F51 39              00440            RTS
7F52 B6     FF20     00460 SUBR       LDA     $FF20
7F55 84     03       00462            ANDA    #3
```

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```
7F57 8A    FC          00464          ORA     #252
7F59 B7    FF20        00466          STA     $FF20
7F5C 5F                00468          CLRB
7F5D 5A                00470 LOOP2    DECB
7F5E 26    FD          00472          BNE     LOOP2
7F60 8E    0094        00474          LDX     #148
7F63 84    23          00480          ANDA    #$23
7F65 B7    FF20        00490          STA     $FF20
7F68 30    1F          00500 LOOP3    LEAX    -1,X
7F6A 26    FC          00510          BNE     LOOP3
7F6C 30    01          00520 LOOP4    LEAX    1,X
7F6E B6    FF00        00530          LDA     $FF00
7F71 2A    F9          00540          BPL     LOOP4
7F73 39                00580          RTS
7F74                   00590 PARAM    RMB     1
7F75                   00600 SAVE     RMB     2
           7F00        00610          END     ENTER

00000 TOTAL ERRORS
```

Listing 2: HIRESJOY

```
10 'MAKE CIRCLES USING MOUSE OR
20 'JOYSTICK AND TANDY HI-RES
30 'INTERFACE ON COCO3. MACHINE
40 'LANGUAGE SUBROUTINE RESOLVES
50 '640X192 PIXELS.
60 CLEAR 200,&H7EFF
70 FOR A=&H7F00 TO &H7F73
80 READ H$:POKE A,VAL("&H"+H$)
90 NEXT A
100 DEF USR0=&H7F00
110 PALETTE 0,63:PALETTE 1,0
120 HBUFF 1,189
130 HSCREEN 4
140 HGET(0,0)-(21,17),1
150 GOSUB 360
160 IF(PEEK(&HFF00)AND1)>0 THEN
150
170 PX=X:PY=Y
180 HPUT(LX,LY)-(X+10,Y+4),1
190 C=HPOINT(PX,PY)
200 HSET(PX,PY)
210 HGET(LX,LY)-(X+10,Y+4),1
220 IF(PEEK(&HFF00)AND1)=0 THEN
220
230 GOSUB 360
240 IF(PEEK(&HFF00)AND1)>0 THEN
230
250 HPUT(LX,LY)-(X+10,Y+4),1
260 AX=ABS(X-PX):AY=2*ABS(Y-PY)
270 R=SQR(AX*AX+AY*AY)
280 R=INT(R+.5)
290 HCIRCLE(PX,PY),R
300 IF C=0 THEN HRESET(PX,PY)
310 LX=X-10:IF LX<0 THEN LX=0
320 LY=Y-4:IF LY<0 THEN LY=0
330 HGET(LX,LY)-(X+10,Y+4),1
340 IF(PEEK(&HFF00)AND1)=0 THEN
340
350 GOTO 150
360 H=X:V=Y:X=USR0(0):Y=USR0(1)
370 LH=H-10:IF LH<0 THEN LH=0
380 LV=V-4:IF LV<0 THEN LV=0
390 LX=X-10:IF LX<0 THEN LX=0
400 LY=Y-4:IF LY<0 THEN LY=0
410 HPUT(LH,LV)-(H+10,V+4),1
420 HGET(LX,LY)-(X+10,Y+4),1
430 HLINE(LX,Y)-(X+10,Y),PSET
440 HLINE(X,LY)-(X,Y+4),PSET
450 HRESET(X,Y)
460 RETURN
470 DATA B7,FF,D9,BD,B3,ED,4F,5D
,27,02,86,08,B7,7F,74,B6,FF,01,8
4,F7,BA,7F,74,B7,FF,01,B6,FF,03,
84,F7,B7,FF,03,8D,2E,BF,7F,75,8D
,29,BC,7F,75,26,F4,1F,10,83,00,0
1,7D,7F,74,27,0D,44,56,10,83,00,
BF,2F,0E,CC,00,BF,20,09,10,83,02
,7F,2F,03,CC,02,7F,BD,B4
480 DATA F4,39,B6,FF,20,84,03,8A
,FC,B7,FF,20,5F,5A,26,FD,8E,00,9
4,84,23,B7,FF,20,30,1F,26,FC,30,
01,B6,FF,00,2A,F9,39
```

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Reversing a PMODE 4 graphic

A Picture Is Worth 6,144 Bytes

By Dennis H. Weide

Last week a friend called and invited me over to watch her transfer a CoCo graphics printout from paper to a T-shirt by ironing it on.

She had bought a special printer ribbon for heat transfers from Diversions, Inc., 1550 Winding Way, Belmont, CA 94002. The ribbon is guaranteed for at least 20 transfers. Ours came out quite well on the second try, and has been washed twice without any apparent fading.

A Backwards Picture

The only problem we had was that the image on paper had to be reversed from the image on the screen in order to print correctly on the T-shirt. Otherwise, all printing would have been backwards.

What seemed easy at first turned out to be more complicated as we attempted to reverse the screen image for printing. Fortunately, I still have my old CoCo manuals, which explain how graphics modes work in the computer. So, with the help of the manuals and Bill Barden's book, *Color Computer Graphics*, we went to work.

Understanding Graphics

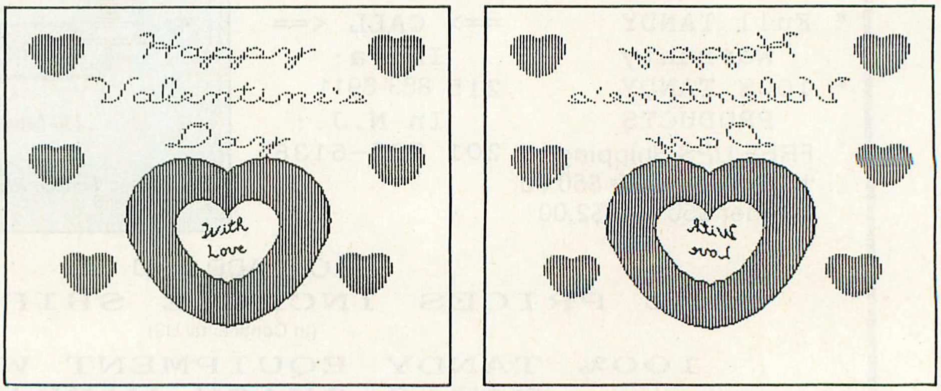
The picture we wanted to transfer was saved on disk from a `PMODE 4` graphics screen, so we set out to write a program that would reverse a `PMODE 4` graphics image.

In this mode, there are 192 rows of picture elements, called pixels, which are numbered from 0 through 191. Each row contains 256 pixels numbered from 0 through 255. Each pixel is represented by one bit of one byte of video RAM (graphics memory). Each row of graphics on the screen is made up of 32 bytes of video RAM (256 bits/8 bits per byte = 32 bytes). Since there are 192 rows displayed on the screen and each row consists of 32 bytes, a full screen of `PMODE 4` graphics requires 6,144 bytes of video RAM (32 bytes X 192 rows = 6144 bytes).

To reverse the video image (but not the colors) on the screen, it is necessary to reverse the bit pattern of each byte as well as the bytes themselves. To help you better understand, look at Figure 1.

Note in Figure 1 that the bit images and byte addresses are actually turned end over end. While this may seem a little complicated at first, once you view the graphics page as a binary picture, you can readily see how to reverse it.

The program *Listing 1* is a short BASIC program that lets you see the bits as they are set and reset. To use the program, key it in and run it. The



The screen dump shown on the left is of a normal graphics image. The reversed image is shown on the right. While color is not indicated here, the program switches red and blue artifact colors as the image is reversed. This should not affect black-and-white printing.

Dennis Weide is a communications technician for AT&T communications in Albuquerque, New Mexico, where he programs AT&T and IBM PCs. He enjoys making toys and teaching computer programming.

graphics screen for PMODE 4 will be displayed.

Type in any number between 0 and 255 (you won't see the text screen until you press the reset button) and watch the bits as they are set on the screen. You can actually see the binary image for each number. The small line you see on the screen is for reference. That byte, Address 4010, has been loaded with 255 to set all 8 of its bits. The address you will be loading, 4042, is directly below that one.

BYTE #	#1	#2	......	#31	#32
NORMAL IMAGE	11000000	11111111	......	10011100	00000000
REVERSE IMAGE	00000000	00111001	......	11111111	00000011

NOTE: The above binary values are arbitrary figures chosen at random for this example. The actual values will depend on the graphics image displayed.

Figure 1

DECIMAL 192 = BINARY 11000000 BINARY VALUE A
DECIMAL 129 = BINARY 10000001 BINARY VALUE B

DECIMAL 128 = BINARY 10000000 RESULT OF LOGICAL AND

Figure 2

Reversing the Image

To help us reverse the image, we'll use BASIC's powerful AND statement. AND allows you to determine which bits in a byte are set and which are reset. The AND statement takes two binary values and produces a result whose binary value represents only those bits that are set in the first *and* second binary number.

Look at Figure 2. Notice that only the leftmost bit of the results is set (equal to 1), because this is the only bit set in both A and B.

To see how the BASIC AND statement works, run the program in Listing 2. Enter a number from 0 to 255 to see which bits are set and which are reset. In each pass through the loop, a logical AND is performed on the value of A and the bit position determined by the formula 2^C. The results are then printed on the screen. This short program is the foundation for reversing bit images on the graphics screen.

The complete BASIC program for reversing the graphics image is shown in Listing 3. In order to accomplish the task, each of the 32 bytes in Line 1 of the screen is read, its bit image reversed and the results stored in an array. When all 32 bytes have been read and stored, the array is read backwards and placed back in the row. This procedure continues until all of the 192 rows displayed on the screen have been reversed.

The BASIC program takes about 31 minutes to reverse a PMODE 4 picture, which is quite a long time. So, I wrote a PASCAL version (Listing 4) to accomplish the same task in about one minute.

After you've loaded your picture file, run the BASIC version (by entering RUN) or the PASCAL version (by entering EXEC) to reverse the image. When the image has been reversed, load your screen print program and install the special printer ribbon. Once printed, your picture is ready for heat transfer.

The next time you have a family gathering, you can pass out T-shirts decorated with your family crest. Or, your club can design their own logos for hats and shirts.

(Questions or comments may be directed to the author at 14201 Marquette N.E., Albuquerque, NM 87123. Please enclose an SASE when writing for a reply.) ☐

Editor's note: The PASCAL source presented here will work on a CoCo 3 if it is entered and compiled on a CoCo 3. You could use the version of Deft PASCAL for this. However, the binary file which will appear on RAINBOW ON TAPE and RAINBOW ON DISK this month was compiled on a CoCo 2 and will not *run on a CoCo 3.*

Listing 1: REVERSE1

```
100 '      LISTING 1
200 '
300 '
400 CLS
500 PCLEAR 4
600 PMODE 4,1:SCREEN 1,1:PCLS
700 POKE 359,57
800 POKE 4010,255
900 INPUT A
1000 POKE 4042,A
1100 GOTO 900
```

Listing 2: REVERSE2

```
100 '      LISTING 2
200 '
300 '
400 CLS
500 INPUT A
600 FOR C=0 TO 7
700 IF A AND 2^C THEN PRINT "BIT
"C"IS SET TO 1" ELSE PRINT "BIT"
C"IS SET TO 0"
800 NEXT C
900 GOTO 500
```

Listing 3: REVERSE3

```
100 '      LISTING 3
200 '
300 '      BACKWARDS GRAPHICS
400 '      BY DENNIS H. WEIDE
500 '      (C) 1987
600 '
700 '
800 PMODE4,1:SCREEN1,1
900 FOR X=1 TO 1000:NEXT X
1000 DIMA(31)
1100 FOR X=3584 TO 9727 STEP 32
1200 FOR T=0 TO 31:A(T)=0:NEXT T
1300 FOR Y=0 TO 31
1400 W=1:Z=7
1500 Q=Q+1
1600 C=PEEK(X+Y) AND W
1700 IF C=W THEN A(Y)=A(Y)+2^Z
```

```
1800 W=W*2:Z=Z-1
1900 IF W<256 THEN 1600
2000 NEXT Y:Z=31
2100 FOR Y=0 TO 31
2200 POKEX+Y,A(Z)
2300 Z=Z-1
2400 NEXT Y,X
2500 FOR X=1 TO 10000:NEXT X
```

Listing 4: REVERSE4

```
(**        LISTING 4        **)
(**                         **)
(** BACKWARDS GRAPHICS **)
(** BY DENNIS H. WEIDE **)
(**        (C) 1987         **)

PROGRAM BACKWARD;

VAR A : ARRAY [0..31] OF INTEGER;
  ADDRESS,B,C,W,X,Y,Z : INTEGER;

BEGIN
  PAGE;
  BYTE[65479]:=0;
  BYTE[65481]:=0;
  BYTE[65483]:=0;
  BYTE[65484]:=0;
  BYTE[65486]:=0;
  BYTE[65488]:=0;
  BYTE[65490]:=0;
  C:=BYTE[65314];
  BYTE[65314]:=(C AND 7)+250;
  BYTE[65477]:=1;
  BYTE[65475]:=1;
  BYTE[65472]:=0;
  ADDRESS:=3584;
  REPEAT
    FOR X:=0 TO 31 DO A[X]:=0;
    FOR Y:=0 TO 31 DO BEGIN
      W:=1;
      Z:=128;
      WHILE W<256 DO BEGIN
        C:=BYTE[ADDRESS+Y] AND W;
        IF C=W THEN A[Y]:=A[Y]+Z;
        W:=W*2;
        Z:=Z DIV 2;
      END;
    END;
    Z:=31;
    FOR Y:=0 TO 31 DO BEGIN
      BYTE[ADDRESS+Y]:=A[Z];
      Z:=PRED(Z);
    END;
    ADDRESS:=ADDRESS+32;
  UNTIL ADDRESS=9728;
  WHILE Z<10000 DO Z:=Z+1;
END.
```

"I cannot imagine the CoCo 3 without ADOS-3; it would not be a complete machine."
The RAINBOW, July 1987

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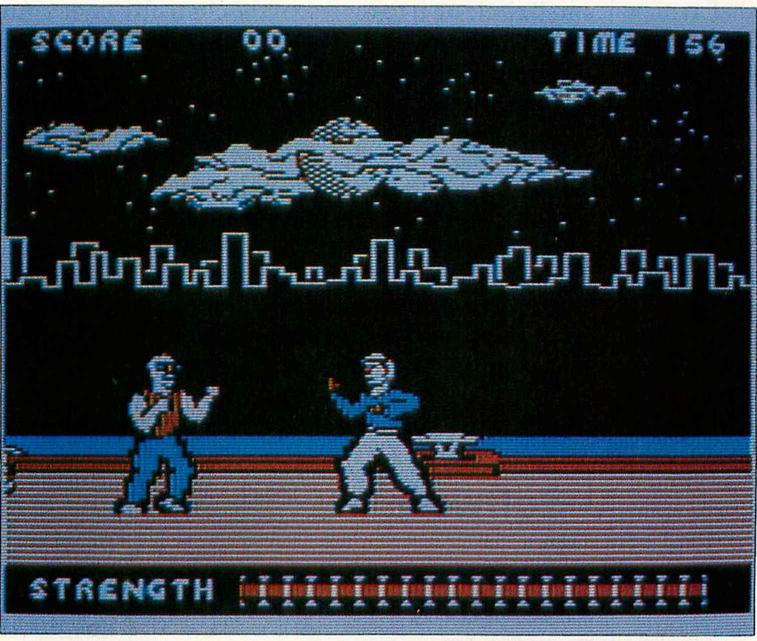


Software CoCo 1, 2 & 3

Kung-Fu Dude — Combat Evil With Karate Action

I hate to mention this fact, but we in the CoCo Community have been living with a serious software void for the past several years. Every other type of computer has had this particular type of software, but we, the CoCo users of America, have had to hide our faces in shame because of this great deficiency. But no longer!

What we have been missing is a great Kung Fu-type arcade game. But Glen Dahlgren of Sundog Systems has come to every CoCo owner's rescue. He has given us *Kung-Fu Dude*. We now have our own great karate arcade game.

With a 64K CoCo, one disk drive and a joystick, you learn that you were born to the royal house of Kilachi and that as a child you were foreordained to destroy the dark temple of evil that ruled the land of your birth. To carry out this life mission, your parents sent you far away to the Orient to learn the ancient mysteries of Kung Fu. Later, you learned that the evil rulers of the dark temple had your parents killed because they refused to reveal your location.

After 19 years of study, you learn that the dark temple has kidnapped your prearranged mate, Princess Trinsim. You decide that now the time has come to seek the destruction of the dreaded dark temple. When you return to your land of birth, you discover that the temple has been moved to a secret location in New York!

Boarding a flight to New York, you soon arrive and begin your search for the evil rulers of the dark temple. Your starting point is the dock area of New York. Almost as soon as you begin your search, you are besieged by hordes of evil henchmen from the dreaded temple. You must call on every skill you have learned of the ancient art of Kung Fu. It is at the New York dock area that the hunt begins.

I had only two problems with *Kung-Fu Dude*. The first stems from the fact that my 9-year-old son, the "Hi-Tech Kid," got the game and the CoCo before I did. After several hours of threats, promises and bribery, I was finally able to regain control of my CoCo (bear in mind that he does have a CoCo of his own, but for some reason would prefer to pound away at Dad's). The net effect of this problem was that he had run up the high scores and it took me days to even make the high score list, let alone beat him. I'm not saying the game is easy by any means, just that he is tough.

The second problem I had with the program (one I have with all programs) was that it is copy-protected. I realize there are many who feel this is a necessary evil in order to prevent software piracy. However, I feel that it does work a decided disadvantage to the legitimate user, as there is no provision for making a working backup copy. I have been using personal computers for over 10 years now and I have seen more than my share of crashed disks, so the first thing I always do, after making sure a program works, is to make a working backup copy for everyday use and store the original away for safekeeping. You cannot do this with *Kung-Fu Dude*.

In all fairness, I must state that Sundog Systems does offer a limited one-year warranty on the program, guaranteeing that the disk will load or they will replace it free. This is certainly much fairer than those companies offering only a 30-, 60- or 90-day warranty.

Kung-Fu Dude is well-written in 100 percent machine language and is a challenge. After several weeks of use, I still haven't made it to the dark temple.

The graphics in the program are done in artifacted colors. And while the program does run on a CoCo 3, you must use a color composite monitor or color TV set. (On an RGB monitor, all you get are black and white stripes.) The program takes advantage of the high speed mode of the CoCo 3. In fact, once the program boots up, you are asked if you want to play in the CoCo 3 high speed mode. Don't try this with a CoCo 1 or 2 or, as the *Kung-Fu Dude* author puts it, "The video will attempt to fry itself."

If you are playing on a CoCo 3, I suggest you follow the author's further recommendation of playing the game at the slower speed the first few times to get the feel of the game. The high speed mode makes this mode look like slow motion. And you are going to need every advantage you can get to survive in *Kung-Fu Dude*.

You control the Dude with your joystick. There is a set of moves that occurs with the firebutton on, and another set of moves that occurs with the firebutton off. Sometimes it is hard to keep track of which is which. To assist you in helping to remember which move goes with which direction and firebutton position in *Kung-Fu Dude* and other games like it that use complicated joystick movement, I would like to pass on a little tip that has helped out quite a bit in the Armstrong household.

We use a small 3-by-3-inch square notepad of paper that you can tear off and stick to any surface, and draw a small circle on it to represent the control radius of the joystick. Then we mark the positions of the joystick as they relate to the various movements in the game, noting what movement each joystick position causes. In the case of *Kung-Fu Dude*, we made two such diagrams — one for firebutton-on movements and one for firebutton-off movements. Because these stick-on notes can be removed and replaced many times, we store them with the instructions to the particular game. Then when we decide to play that particular game, we simply take them out and stick them near the face of the computer screen for quick reference. It is a real help.

Notwithstanding the fact that the program is copy-protected and the Hi-Tech Kid makes it tough for his old Dad to catch up with him, I highly recommend *Kung-Fu Dude*. It is not a game that you will master easily, so it is one that you'll be playing for a long time to come. And if complexity and challenge are a criteria of worth, you'll certainly get your money's worth on this one.

Now the CoCo karate game gap has been filled, and *Kung-Fu Dude* does it excellently. CoCo users of America, hold your heads up high!

(Sundog Systems, 21 Edinburg Drive, Pittsburg, PA 15235, 412-372-5674; $24.95: First product review for this company appearing in THE RAINBOW.)

— Kerry Armstrong

Software CoCo 1, 2 & 3

Disklock — Put a Padlock on Your Data

Having just read a novel about a criminal who kept a journal of his misdeeds on a disk (alas, not a CoCo) and was caught because of it, I looked forward to reviewing *Disklock* by Brian Rodia. Computer security has become a very important issue in the last few years, and even though the criminal aspect is not what RAINBOW readers are interested in, most computer users have some files they would like to keep private.

Disklock and its manual come on an unprotected disk. That means you must have a printer and a word processor to print out the instructions. The manual was written with *VIP Writer* but doesn't cause any problems, even with *Scripsit*. If you don't have a printer but have ADOS, the manual can be read on the screen using the `SCAN` command.

The purpose of the program is to deny anyone but yourself information from your disk files. It does this very well. The author states he has had *Disklock* tested for some time and no one has been able to break the protection. I made a nominal effort to disable it using a disk zapper and wasn't successful, even though it was obvious the program writes code to the first two sectors of Track 17.

The program is very simple to operate. Put the disk in Drive 0, type `LOADM DISKLOCK` and at the OK prompt type `EXEC`. Then remove *Disklock* and place any disk in Drive 0 and press ENTER. You are given the status of the disk, locked or unlocked, and prompted for a password. When you are returned to the title screen, pressing BREAK returns you to BASIC.

When you type in a password to unlock a disk, the characters are masked on the screen so as not to make it apparent to kibitzers. If you lock a disk and then issue a `DIR` command from BASIC, all you get is `LOCKED!` If you try to unlock a disk without the password, you get three tries and, if unsuccessful, are thrown back to BASIC. A password can be up to 14 characters long, allowing the user a lot of latitude for exotic combinations.

As it is, I think *Disklock* is a valuable utility if you need the security it provides. Brian Rodia is issuing it as a shareware program, so payment is whatever you feel it's worth. It is advertised to work on all three Color Computers. I tested it on both the CoCo 2 and 3 and the performance was identical.

The only criticism that could be made is that there are no screen prompts and no provision is made for multiple drive operation. Considering the simplicity and price of this program, that may be the ultimate in nitpicking. The last caveat, which the author stresses, is don't accidentally lock your *Disklock* disk unless you have a backup!

(Brian J. Rodia, 6593 Redcoach Ln., Reynoldsburg, OH 43065, 614-868-0216; Shareware: First product review for this company appearing in THE RAINBOW.)

— Frank Mardon

Software CoCo 1, 2 & 3 OS-9

Robot Odyssey — Adventures in Robotropolis

You have fallen into Robotropolis, an underground city populated by robots. Your mission is to escape back to civilization, with a little help from the robots. *Robot Odyssey* combines a five-level Adventure game with a set of problem-solving tutorials designed to help you complete the journey. This is not your typical Adventure game. Plan on spending weeks (if not months) completing this one. Fortunately, games can and should be saved as you go along.

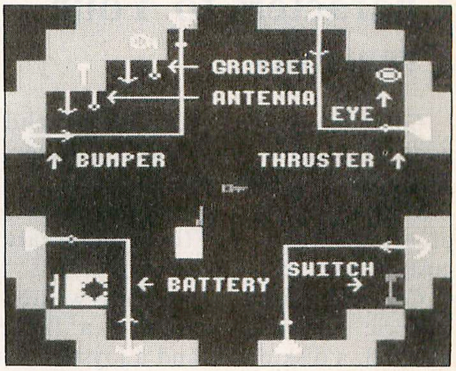
Section One involves a robot anatomy course, which takes about 20 to 30 minutes to complete. The player gets a detailed look at how robots behave and what equipment they have. This knowledge helps get you through Level 1. Before moving on to the next level, it's necessary to learn about wiring and robot circuits. In the higher levels of the game, learning chip design and doing some experimentation is essential for success.

The Learning Company has gained a reputation for developing excellent educational software, and this program is no exception. Contained within the program is a mini-course in electronic engineering, design and problem-solving skills. In a way, it's a logical sequel to *Rocky's Boots*, an earlier program they developed. If you aren't acquainted with *Rocky's Boots*, I'd suggest that you start with it first. Not only will the experience be fun and educational, it will help you with *Robot Odyssey*.

This program is a natural for teachers who want to teach problem-solving or the Scientific Method. The Learning Company has additional classroom materials available to accompany the program. Vocational, electronics and electrical engineering instructors should also look closely at its possibilities. It would make an excellent introductory project.

Recommended age for this Adventure is 13 and up. I agree. The tutorials are deceptively easy, but looking at the program as a whole can be a mind-boggling experience that would be better handled by teens and adults. The tasks become increasingly more complex at the higher levels of the game. To make things more interesting, obstacles such as power-sucking 'Ampire bots and invisible mine fields appear. There are so many variations in *Robot Odyssey* that it can be used over and over again, which is a definite plus for both home and school use.

The graphics are excellent, the educational goals sound, but some aspects of the 70-page manual bugged me. It has directions for the IBM PC and Apple, along with the CoCo. When reading for information, you have to wade through three different sets of commands to figure out how to perform a particular operation. I would gladly pay extra to have a separate Color Computer version. Also, it is interesting to note that certain "extra" sections, such as a Robotropolis Preview and Robot Teamwork were conspicuously *absent* from the CoCo version of the program.



Robot Odyssey is designed primarily for the CoCo 1 or 2, and uses artifact colors that don't show up on the CoCo 3 when used with an RGB monitor. CoCo 3 users need a composite monitor or TV to take advantage of the color capabilities. I hope The Learning Company will consider adding an RGB/composite option on start-up like some of the newer OS-9 software that is currently available.

Robot Odyssey deserves an 'A' for both its novel approach and educational value. Although the manual is a bit awkward in some respects, it is obvious that the authors put a lot of care and planning into the program itself. I'm glad that excellent software such as this, once only available for the Apple and PC Compatibles, is now available for the Color Computer.

(The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555, $49.95. Available in Radio Shack stores nationwide)

— Mark Haverstock

Check Account Information System

Manage your checking account(s) with CAIS. Keep track of deposits, checks, ATM withdrawals and other account transactions. Define up to 36 categories to monitor expenses. Set up automatic transactions for such items as direct deposits or pre-authorized deductions. Balance your account(s) in minutes! Other features include multi-drive capability, display and print options, history purge and more.

Requires 1 disk drive
Printer is optional
CoCo 3 compatible

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See review in this month's issue!

Software CoCo 3

Color Max 3 Font Editor — Add Characters to Your Creations

Color Max 3 Font Editor is a useful addition to your *ColorMax 3* package. With this program, you can load various print fonts into your *Color Max 3* creations, then edit them or create custom ones to suit your own tastes.

Color Max 3 Font Editor was written by Eric A. Wolf. It requires a 128K CoCo 3, a disk drive, and a joystick or mouse. The program is loaded in with a simple BASIC loader that calls the main machine language program. The disk is not copy-protected, so backup copies for your own use are not a problem.

After loading the program and answering prompts concerning RGB or composite monitors and type of joystick in use, you are presented with the main operating screen. This screen consists of a grid and a point-and-shoot menu that allows you to examine each character in detail or to modify it.

At the bottom of the menu is a number that ranges from 032 to 127 representing the ASCII value of the character. This number is toggled with the joystick or mouse firebutton to select the character you want to examine or modify. The view font option allows you to see all the characters of a particular font at the same time. The disk contains the following fonts: Crystal, Downhill, Film, Glyphic, Old English and Stripe.

Glyphic is a neat collection of 70 small pictures and symbols that can be added for some nice effects with *Color Max 3* pictures. Downhill has a slanted effect, and Crystal looks like the LCD characters on your wrist watch. The Film font looks like the standard block letters, except they are in negative form and have little sprocket holes at the top and bottom of each character font frame. The others speak for themselves and are equally well done.

The fonts can be edited or new ones created by simply clicking the firebutton at the cursor position pointed to by the movable arrow. The grid is done in typical "fat bit" style, providing the opportunity to easily modify or create special characters and symbols.

A second disk containing 11 other fonts is available for $19.95. The fonts contained on this disk include Lined, USA, Cameo, Potted, July 4, Bells, Roadsign, ASCII-SM, Tech-Lg, Banner and Large.

Color Max 3 Font Editor is a good program and is sure to enhance *Color Max 3*. I found it both easy and fun to use.

(Spectrum Projects Inc., P.O. Box 264, Howard Beach, NY 11414, 718-835-1344; $29.95 plus $3 S/H)

— Jerry Semones

Software CoCo 1, 2 & 3

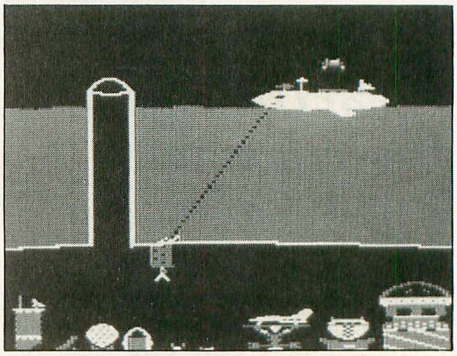
Currillian Cruiser — The World's Last Hope

"The year was 2584. Four hundred seventy-two years after the unification of the Earth-born galaxies. The largest and most terrible war was just beginning to dawn, a war with little warning and relentless fighting. Many people lost their lives, whole planets were shredded without the Earth-men ever having a hint what had or could have done something of this magnitude. This is the tale of the Skirum War and the *Currillian Cruiser.*"

You are the sole pilot of the ship and the last hope for Earth. In your journey to complete the defense systems of the *Currillian Cruiser*, you will travel to distant planets and encounter many enemies. While traveling to the planets Elleval, Ita-Falac, Scmea, Denrael and Alpha Centuri you fly head-on into a hazardous meteor shower, face merciless unmanned Skirum interceptor attack vehicles, and enter the hulls of military and scientific research vessels to obtain a missing weapon system, a fission laser system, warheads and a guidance system.

Currillian Cruiser is an arcade-type Adventure game that has good game play and a brilliantly written scenario.

The copy-protected disk comes with a four-page manual featuring a detailed drawing of the *Currillian Cruiser* on the front. The second page of the manual contains information on loading, playing (a note to remove the disk during game play since the computer accesses the disk many times) and saving the game. The last two pages give the story of *Currillian Cruiser.*



The game can be used on a Color Computer 1, 2 or 3 and requires a joystick. I recommend a self-centering joystick since you must make fast and difficult maneuvers during most of the game.

Currillian Cruiser has some nice features. The main menu has options to start the game, go to the title screen, see the high scores and quit the game, which requires you to shut off the computer.

After choosing the start game option, you are prompted to type in your name for a new game or to choose a number from one of the maximum nine game saves. The high score screen lists up to 12 scores. In this game, scoring goes by the number of the board you survived through. Between boards, you are prompted with options to continue to the next board, save the game or quit the current game.

The PMODE graphics come out in

One-Liner Contest Winner . . .

Use this program to look at the contents of your disk and check for errors. It's helpful for Adventure disks, too!

The listing:

```
1 CLEAR10000:FORX=0TO34:FORY=1TO
18:DSKI$0,X,Y,A$,B$:PRINTA$;B$;:
IFINKEY$=""THEN NEXTY:PLAY"L255;
1;12":NEXT:ELSE PLAY"P2":NEXTY:P
LAY"1;12":NEXT
```

Brad Lowe
Lafayette, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

black-and-white on the Color Computer 3 when using an RGB monitor. The screens are nicely done and give the effect of a futuristic setting.

Altogether, this game is pretty good. It requires a lot of hand-eye coordination and is challenging.

(Glenn Calafati, 54 Oak Street, Northport, NY 11768, 516-261-4105; $25: First product review for this company appearing in THE RAINBOW.)

— Glen Baisley

Software CoCo 1, 2 & 3

Master Disk — Catalogs Your Disks

Master Disk is a disk cataloging program that works on any version of the CoCo having at least 32K. The program is written in BASIC and is not copy-protected. *Master Disk* works with a single disk drive and, therefore, may be of interest to beginners.

Master Disk is very colorful and, I might add, somewhat noisy. I mention this only because while the program is well-structured, the continued call to the sound subroutines does slow down overall program execution speed.

Master Disk is menu-driven and very easy to use. A single page of instructions comes with the disk, but the program contains onscreen help. You can create, sort, print and save to disk up to 18 disk directories with up to 250 program names in each directory. This provides a sufficient number of disk categories for most users, and with 250 program names in each category, the program will handle most CoCo user applications.

Master Disk lets you look at all entries by a specific searched-for name, or an entire disk directory. In addition to saving and displaying program names and extensions, the name of the disk containing the program is saved and displayed. This name is assigned by the user and is limited to nine characters.

This offering from Bob's Software is worthy of your consideration. The price won't make a big dent in your wallet and you can put *Master Disk* to practical use organizing your disks.

(Bob's Software, P.O. Box 391, Cleveland, OH 44107, 216-871-8858; $15 plus $2 S/H)

— David Gerald

Software CoCo 1, 2 & 3

CAIS — Check Account Information System

I used to have a pathological hatred of the simple act of balancing my checkbook. It's not that I was afraid of the work, I just didn't like to spend the time doing it. Now the hard part is done for me, thanks to *CAIS*.

CAIS stands for Check Account Information System. And before you let fly that groan of, "Oh no, another checkbook program!" let me tell you that *CAIS* is not run-of-the-mill. It is a fast, simple, accurate and yet very detailed way of handling up to eight different accounts.

CAIS was written for the disk-based CoCo 1, 2 and 3 using RS-DOS 1.1. I used ADOS-3 and had no problems with any functions.

The only command to remember is the one that starts the program (`RUN "CAIS.BAS"`). After that, there are extensive onscreen prompts, as well as full menus wherever possible. On start-up, all you need to do is enter the current date, and the main menu appears.

The first time you use this program, you will need to define the account information. This is where you enter the name of the bank, account type (regular or interest-bearing), what drive you want the information stored on, and the account number and balance. And for once, here is a program that stores your number exactly as you enter it — regardless of how many digits it contains. This has been a problem with every other checking program I have seen.

You may continue to enter information about other accounts you want to track. I have three checking accounts (one account for my wife, one for me and one for business). As I wanted to use the program as much as possible, I also added my two savings accounts to the batch.

After you have entered this information (along with the account balance — the program tracks each account individually), you may either edit the information or return to the main menu to begin the processing.

When you select an item from the main menu other than the account control (the setup option), you are presented with another menu to help you select which account you want to access. Your other main menu choices are Post Account, Reconcile (balance) Account, Display Account, Print Account, Purge Account History and Exit.

Post Account means just what the name implies. This option allows you to make deposits, debit the account, and otherwise manipulate the figures. And

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for each expense or credit, an option is given to apply the amount to an expense category you previously defined (up to 36 definitions per account). I said before how easy it was to use this program to track savings, as well — all I did was define a category as "Withdrawal" and one as "Deposit." I used the "Payable to" field to explain the transaction.

Flexibility is the key in posting transactions. You may enter codes for deposit, checks (it keeps track of the numbers, unless you override it), ATM withdrawals and any automatic deposits/withdrawals you care to define. The autos use the date you enter both at the beginning of the program and in the definition of the automatic transaction to make the change at the appropriate time. And it notifies you of that change. This is a real "set and forget" feature.

Reconcile Account provides a detailed balance report with a minimum of work on your part. Pick a starting check number, and the program steps through each transaction with you to see if the statement covers it. If not, the information is added to the stack and the selection process continues.

When presented with the balance, all you need to do is compare it with the bank's statement. If it is not correct, press BREAK and research the problem. If it is correct, you may then print the statement. The cleared transactions are moved to a history file, and you may then print the updated check register or return to the main menu.

Display Account and Print Account are essentially the same. One shows the information onscreen only, and the other prints both to the screen and the printer (the baud rate you want is poked in for you, since you set this option way back at the beginning). At this point, you can literally see any combination of information needed either between two dates, or from all the information on file.

The final option is Purge Account History. Here is where you can delete older information by date. All you do is enter the beginning and ending dates, and all information between those dates is purged. The rest remains intact. If you print a copy of the file before you purge, you can save disk space and still have the information handy.

The manual that comes with the program is very detailed and extremely easy to follow. It is laid out in the same order as the main menu. Each option is explained in depth, and the information necessary to use each option is readily available on that page. The only other thing I would like to have seen is one page devoted to the one-letter codes used throughout the program (D=Deposit, C=Check, etc.). Then I could set this page next to my CoCo and get into high gear.

The nice thing about *CAIS* is that one version fits all. It doesn't matter whether you have a CoCo 1 or 3, one disk drive or two, or even whether you have a printer. The program is flexible enough to handle whatever system you have. The manual (70 pages) tells you how to configure to your system, all within the program (no editing required).

Overall, *CAIS* performs well beyond the advertised limits. I found it both easy to use and flexible enough to handle whatever my financial situation required. The manual is detailed without being dry. And the price is low enough to put it within reach of virtually anyone. In short, if you have a checking or savings account, *CAIS* should be in your library.

(After Five Software, P.O. Box 210975, Columbia, SC 29221, 803-788-5995; $34.95 plus $3 S/H)

— D.A. Ferreira

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Draft and various NLQ type styles.

star micronics

The NX-1000 gives you plenty of print options for attractive printing. Four typestyles. Four pitch sizes, in standard and italics for a total of 32 NLQ modes. 1 year warranty. Nationwide depot service from Honeywell. 30 day online trial.

SPECS: 144 cps Draft, 36 cps NLQ, Italics Sub & Superscripts, Emphasized, Doublestrike, Proportional, Condensed, International, Downloadable Char., 4 built in fonts, Graphics 480-1920 dots/line, Forward or Reverse n/216" Line Feeds, Friction and Push Tractor, 4K Data Buffer, Hex Dump.

SYSTEM INCLUDES:
- Star NX-1000 Printer
- Blue Streak 3 Interface (see opposite page)
- Software Support Trio (see below)

$239.95
+$10 Shipping and Insurance
COMPLETE

Software Support Trio

TYPE SELECTION/ TUTORIAL	DRAYON'S WORD PROCESSOR 2.3	SUPER GEMPRINT	COLOUR SUPER GEMPRINT
Online instructional program that will select 24 special features of your printer or display methods to incorporate them into your programs.	Create, save and print customized documents with full access to printer's special features.	Will transfer a Pmode 0, 1, 2, 3, or 4 picture screen to printer 8"x11" hardcopy. Black/white, white/black or grey level shading for color.	Transfers color screens to Colour NX-1000. 8"x11" hardcopy in any two colors for Pmode 0, 2 or 4 and any 4 colors for Pmodes 1 & 3.

Software Trio $19.95 Software Trio w/Colour Super Gemprint $29.95
Price, availability and specifications subject to change without notice.

DAYTON ASSOCIATES of W.R. HALL, INC.
7201 CLAIRCREST, BLDG. D
DAYTON, OHIO 45424
OHIO RESIDENTS ADD 6% SALES TAX • C.O.D. ADD $2.00

PERSONAL SERVICE
(513) 236-1454
Visa & MasterCard
within the continental U.S.

Video Cards/Keno — Play the Odds

Video poker machines are found in a lot of places outside of Nevada where gambling on them is legal. In some areas they are regular fixtures in local bars and lounges. For some, they are a kind of adult video game. For others, they are another opportunity to gamble. If you play them or if you have always wanted to, *Video Cards/Keno* from Tom Mix Software may be for you.

Video Cards/Keno is designed for the Color Computer 3 with disk drive. The instructions are simple and the disk loads easily. After a title page the screen presents a menu. Your choices are Poker, Joker's Wild, Blackjack, Keno and Quit. After you make a choice, the screen asks if you are using a composite or RGB monitor. The next screen asks the number of credits you want to start with, and then your game begins with a prompt asking you how much you want to bet. You bet and the cards are dealt. (Or, in Keno, the numbers are chosen.) If you win, your credits are increased. Unless your credits are down to zero, you again return to the bet prompt. You can play as long as you have credits to bet. (If you do run out of credits, you can always get more.)

Poker and joker poker are fun to play. (The difference between the two games, for those unfamiliar with poker machines, is that the deck used in joker poker contains a joker that can be used as a wild card. Because it is easier to draw a winning hand, the payoffs are reduced.) As with the real machines, the deck is stacked against you. Payoffs do not reflect the true odds — the longer you play, the more likely you will lose. Trying to overcome the laws of probability can be enjoyable and maybe even educational.

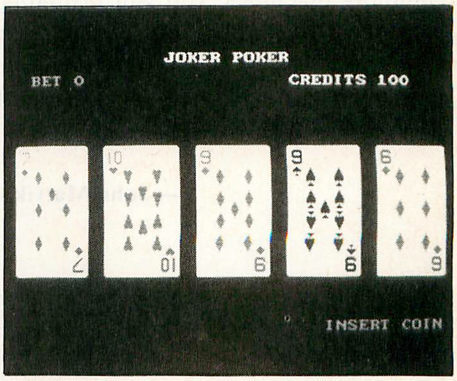
I found blackjack to be even more fun. (I find that competing against someone, even if it's the computer as dealer, makes a game more interesting.) The game is not much different from the game played in a casino. Thus, learning the right blackjack moves can significantly reduce the computer's advantage. The blackjack game was fast and entertaining.

Keno allows you to pick numbers from 1 to 80 and then the computer chooses the winning numbers. Payoffs are based upon how many numbers match. (State lotto-type games work in a similar fashion.) Keno/lotto games have never fascinated me. Predictably, I found this game to be the least interesting of the games.

This package has two strong points to recommend it. The first is its outstanding graphics. Each program makes use of the Color Computer 3's added graphics capabilities. I own other programs that use playing cards in the program. In terms of resolution, *Video Cards/Keno* is the best.

Secondly, I liked the speed of the programs — cards are dealt and results are computed very quickly. Additionally, each game allows for a maximum bet key that saves the time of pressing the C (for coin) key over and over again.

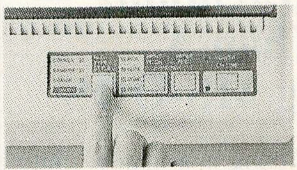
If I could have asked for more from



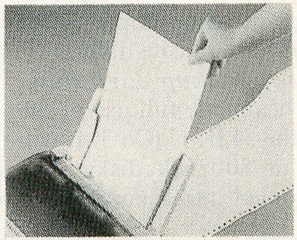
...For the CoCo!

7 COLOR PRINTER!

MULTI-FONT PRINTER
NX-1000
RAINBOW



Select print mode, typeface and print pitch all from the front control panel.



Single sheet feed possible without removing sprocket paper.

star micronics

All the features, performance and dependability of the NX-1000 plus online access to 7 color printing and graphics. Black, blue, red, yellow, green, violet, and orange.

SYSTEM INCLUDES:
- Star NX-1000 Colour Printer
- Blue Streak 3 Freedom Interface (see below)
- Software Trio (see opposite page)
- Colour Super Gemprint

$329.95 +$10 Shipping and Insurance COMPLETE

Blue Streak 3 Freedom Interface

BLUE STREAK THREE
PARALLEL
SERIAL

Introduce your CoCo to the World's Best Printers

This 3rd generation Blue Streak gives all CoCos transparent access to parallel printers and opens an additional serial port with the flick of a switch. Break loose from the speed constricting serial ports of those custom manufactured printers and run up to 9600 baud. Easily connected, one year warranty, 30 day online trial.

$49.95 +$2 Shipping
Powered Verson add $5.00

Price, availability and specifications subject to change without notice.

DAYTON ASSOCIATES of W.R. HALL, INC.
7201 CLAIRCREST, BLDG. D
DAYTON, OHIO 45424
OHIO RESIDENTS ADD 6% SALES TAX • C.O.D. ADD $2.00

PERSONAL SERVICE
(513) 236-1454
Visa & MasterCard
within the continental U.S.

Tom Mix Software, it would have been the ability to make slight changes in either the payoffs or the way the games are played. (I like more of a chance in poker games.) Overall, if you enjoy gambling machines, you will probably enjoy *Video Cards/Keno.*

(Tom Mix Software, P.O. Box 201, Ada, MI 49301, 616-676-8172; $29.95)

— John Matviko

Software CoCo 1, 2 & 3

Color Math — Reinforces Math Skills

Color Math is an educational program that lets your child practice the four basic math skills (addition, subtraction, multiplication, division) he or she is learning at school. It requires at least 16K and a cassette recorder.

The option screen allows you to choose one of the two options in that part of the program (each part has either addition and subtraction, or multiplication and division). You then choose the maximum number of programs the child will practice, and then select one of the four options: Placement, Lessons, Tests or Change maximum problems.

The first option allows you to find the most appropriate skill lesson for your child to start his or her lessons. The second option uses skill building to increase math skills and has automatic promotion as each lesson is mastered. The third option tests your child on any lesson in the program to evaluate proficiency at that level. The fourth option allows you to change the number of problems that your child will do.

After you choose the option you want, the child starts working the problems. The addition/subtraction lessons have 70 different mastery levels, the multiplication has 50 mastery levels, and the division has 37 mastery levels.

In the early mastery levels, the child is shown when to carry or borrow numbers, and in the higher levels the child can use the letters 'C' or 'B' to perform these functions. In addition and subtraction, the child has two chances to answer a question correctly. After the second try, the correct answer appears, and the problem is repeated until it is solved correctly. In multiplication and division, the computer checks each digit as it is typed. The child gets two opportunities to enter each number correctly. If both tries are wrong, the correct digit appears and the cursor moves to the next digit. After each lesson is completed, you see the report screen, which shows if the child is promoted to the next level or demoted to the previous level.

Color Math is a good program. It not only helps the child to improve his/her math skills, but provides the needed reinforcement of those skills. This is also a good program if you want to monitor your child's progress as he or she goes through each lesson.

(Tandy Corporation, 1700 One Tandy Center, Ft. Worth, TX 76102; $19.95. Available in Radio Shack stores nationwide.)

— John H. Appel

Software CoCo 3

Backup Lightning — Faster Than A Speeding MS-DOS

Backup Lightning is a handy utility for the 512K equipped Color Computer 3. As the program name implies, this software is used to duplicate disks.

In developing *Backup Lightning*, Color Venture has made full use of the capabilities of the 512K CoCo 3. It will copy 35-, 40- or 80-track disks. The entire disk is copied into memory as a first step, then duplicates are written as requested. Both RS-DOS and OS-9 format disks are copied with ease. The speed at which the duplication is done is remarkable.

Using *Backup Lightning* is as simple as typing `LOADM "BACKUP"` and answering a few prompts. The user can then load a previously saved configuration or may choose to input the few pieces of data needed for a new configuration. One- or two-sided drives may be selected. Drive speed may be maximized up to 6 ms and up to four drives (0, 1, 2, 3) are supported.

The display screen keeps the user informed of what the parameters selected are, and what is currently going on. The program name and copyright information appear at the top. Just below that, a configuration screen displays the parameters (number of sides and drive designations for read and write, setup rate, etc.) currently being used. A menu/status area occupies the major portion of the screen, telling the user what actions are taking place. Along the bottom of the screen is a help message area.

I had no difficulty at all in duplicating either RS-DOS or OS-9 disks, with either formatted or non-formatted target disks. As a believer in the precaution of backing up all of my software, I found the program invaluable. Copy-protected software, however, cannot be duplicated with *Backup Lightning*.

If you have a 512K CoCo 3 and want to protect yourself from disk crashes, *Backup Lightning* is a very handy tool and an excellent value.

(Performance Peripherals, 11432 Pena Way, Mira Loma, CA 91752, 714-681-7222; $19.95)

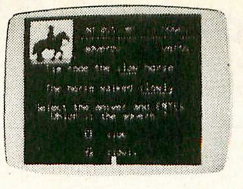
— Leonard Hyre

Hint . . .

Disk or Cassette I/O Errors?

Make sure the disk drive(s) and cassette recorder are not on the left side of the TV set (or if they are, that they're at least six inches or more away). This is because a TV set's flyback transformer, almost always on the left side of the set, puts out a strong magnetic field which can interfere with cassette or disk operation.

Education Breakthrough



New interactive CoCo software makes learning easy, fun. Kids love it!

! PRICES SLASHED! !

NEW LOW PRICE – 16 lessons for the price of 8! Educational Software for kids from 6 to 18.

Parents are depending more and more on supplemental education for their children. Educators know that the most effective teaching is done one-to-one. Through individual attention and self-paced progress, students learn more and retain more.

BETTER THAN A PRIVATE TUTOR

The Compass Education Software LOOK/LISTEN/LEARN approach is the next best thing to a private tutor. Unlike other educational software the Compass Library also *talks* to the student — not in synthesized speech, but in a real human voice. With on-screen textual information and attention-getting graphics, students of all ages actually enjoy learning!

SELF-PACED FOR BETTER RETENTION

The lessons advance only after the student has correctly answered the questions throughout the programs assuring that the material has been thoroughly absorbed.

SIMPLE EQUIPMENT REQUIREMENTS

All you need is the TRS-80* Color Computer (any model), computer cassette recorder and TV set. Once the cassette is loaded you need only enter two simple commands . . . and then press any key to start the lesson.

Of course you can stop the lesson at any point to study information on the screen. Just push the pause button on the cassette player. Push it again and lesson resumes.

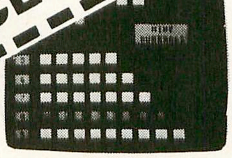
To answer questions throughout the lesson simply press the appropriate number on the computer keyboard, type in the correct answer, or follow other easy instructions. And to go back and review, just rewind the cassette. It's that simple.

CHOOSE FROM 9 SUBJECTS

There is not sufficient space in this advertisement to list all lesson titles, but here is a sample:

MATHEMATICS

In today's advanced, HiTech world, understanding and working with numbers is essential. Compass has developed three comprehensive series of math programs. From basic numerals for the very young, to algebra and higher mathematics for the older child. In between, there are programs for everything from addition and subtraction to practical everyday percentage problems.



① MATH/FRACTIONS

Grades 4 to 8

MF 1 — Numerator, denominator, bar
MF 2 — Multiplication of fractions
MF 3 — Factors and prime numbers
MF 4 — Reducing fractions, reciprocals
MF 5 — Reducing fractions, lowest terms
MF 6 — Proper fractions, mixed numbers
MF 7 — Multiplication-division of fractions
MF 8 — Addition-subtraction of fractions
MF 9 — Addition of mixed numbers
MF 10 — Changing fractions to decimals
MF 11 — Converting decimal numbers
MF 12 — Word problems using percents
MF 13 — Additional problems using percents
MF 14 — Word problems using percents
MF 15 — Finding circle area using pi
MF 16 — Using a ruler to measure fractions

② MATH/BASIC ALGEBRA

For all grades

Sixteen lessons: MBA-1 to 16

③ MATH/NUMBERS

For grades 1 to 6

Sixteen lessons: MN-1 to 16

SELF DEVELOPMENT

Writing effectively means communicationg effectively. Through the writing series of lesson students of all ages will develop basic skills needed to turn thoughts and ideas into expressive words and phrases.

④ RULES OF WRITING

For all grades

Sixteen lessons: RW-1 to 16

LANGUAGE ARTS

A practical education begins with good reading skills and is continued with increased vocabulary comprehension and, of course, spelling. Your child will learn that reading is fun while they are also learning when to use "to," "too," and "two," and how to spell when building a vocabulary.

⑤ THE MAGIC OF SPELLING

Grades 4 to 8

MS 1 — Plurals: branches, rodeos, valleys
MS 2 — Plurals: houses, brushes, candies
MS 3 — Plurals: babies, pianos, leaves
MS 4 — Suffixes: boxed, referred, writing
MS 5 — Suffixes: paid, quickly, extremely
MS 6 — Suffixes: said, confusion, school's
MS 7 — Homonyms: two, too, to; their, there
MS 8 — Homonyms: our, are, hour; ate, eight
MS 9 — Homonyms: weight, wait; who's, whose
MS 10 – Homonyms: scent, cent; sell, cell
MS 11 – Homonyms: dew, due; course, coarse
MS 12 – Homonyms: cite, site, sight; by, buy
MS 13 – Homonyms: blue, blew, creek, creak
MS 14 – Homonyms: sale, sail; steel, steal
MS 15 – Spelling by Syllables: letter, color
MS 16 – Doubling Consonant Letters: hollow

⑥ VOCABULARY COMPREHENSION

Grades 3 to 5

Sixteen lessons: VC-1 to 16

⑦ READING COMPREHENSION

For all grades

Sixteen lessons: DRC-1 to 16

⑧ SCIENCE SCIENCE/PHYSICS

For all grades

Sixteen lessons: SP-1 to 16

⑨ HISTORY AMERICAN HISTORY

For grades 4 to 12

Sixteen lessons: AH-1 to 16

So there it is . . . no-nonsense subject matter presented in a way that maximizes understanding and retention.

SPECIAL PRICING

YORK 10 is now offering, for a limited time, a complete set in any subject, 16 cassettes, one lesson on each cassette, for only $49.95. We originally offered only 8 cassettes for the same amount so now it's twice the value. The same 16 cassettes are sold elsewhere for over $150.

To order, send your check or money order for **$49.95** (CA residents add sales tax) for each subject you wish, plus **$3.50** shipping and handling (any quantity). For immediate shipment, call collect the number below and charge your VISA or MASTERCARD.

YORK 10®
9525 VASSAR AVENUE
CHATSWORTH, CA 91311
1-818/700-0330

*TRS-80 is a registered trademark of The Tandy Corporation.

Received and Certified

The following products have recently been received by THE RAINBOW, *examined by our magazine staff and issued the* Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

◆ **CCRAM**, a software-only implementation of a RAM disk. The program requires OS-9 Level I Version 2, 512K and single disk drive. For the CoCo 3. *Dime-A-Byte, 116 Webster Avenue, Bangor, ME 04401, (207) 942-0739; $28 plus $2 S/H.*

Chemistry Tutor, an educational learning aid for high school or college level chemistry principles. Text lessons are combined with high resolution graphics. For the CoCo 1 and 2. *A to Z Unlimited, 901 Ferndale Boulevard, High Point, NC 27260, (919) 882-6255; $42 plus $3 S/H.*

CoCo Max III, a graphics drawing system with animation and color sequencing. Includes Hi-Res interface for your mouse or joystick, *CoCo Max III* disk and several utilities. For the CoCo 3. *Colorware, 242-W West Avenue, Darien, CT 06820, (800) 221-0916; $79.95.*

Grand Prix Challenge, a high-speed racing game that lets you compete against the computer or a friend. Includes detailed 320-by-200 graph-ics, realistic driving conditions and different race tracks. For the CoCo 3. *Diecom Products, Inc., 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8, (416) 878-8358; $28.95 U.S.; $38.95 Cdn.*

Lightning RAM Disk, a utility for your 512K CoCo 3 that allows the simultaneous use of up to four mechanical drives and two RAM drives. *Dr. Preble's Programs, 6540 Outer Loop, Louisville, KY 40228, 502-969-1818; $19.95.*

MPI-CoCo Locking Plate, an accessory that protects your CoCo 3 and multipack interface. Installs on the bottom of both units and prevents bumping of the multipack interface from the ROM slot of your CoCo. For the CoCo 3. *Gimmesoft, P.O. Box 421, Perry Hall, MD 21128, (301) 256-7558; $9.95.*

Printer Lightning, a ColorVenture print spooler which gives a 44K print buffer from a 128K CoCo and up to 438K from a 512K CoCo. *Owl-Ware, P.O. Box 116-A, Mertztown, PA 19539, 800-245-6228; in Penn., 215-682-6855; $19.95.*

The Rat Graphic Design Package, a graphics program that supports 320-by-200 Hi-Res graphics made with a 16-color, user-definable palette. The package is complete with screen print routines, a mouse and mouse pad. For the CoCo 3. *Diecom Products, Inc., 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8, (416) 878-8358; $69.95 U.S.; $99.95 Cdn.*

Sixdrive, Version 1.0A, a machine language utility that modifies Disk Extended BASIC 1.0 or 1.1, *FKEYS III*, or ADOS to allow the use of three double-sided drives as six single-sided drives. For the CoCo 1, 2 and 3. *Gimmesoft, P.O. Box 421, Perry Hall, MD 21128, (301) 256-7558; $16.95.*

Super-Graphics 16, a graphics program that lets you create art using every color of the rainbow. Draw and paint lines, boxes, circles, etc., and make a printed copy with a Radio Shack DMP-105 or similar dot matrix printer. For the CoCo 1, 2 and 3. *E.Z. Friendly Software, Hutton and Orchard Streets, Rhinecliff, NY 12574, (914) 876-3935; $16 plus $1.50 S/H.*

TX-80, a printer page editor with 5,280 print positions. The program allows global editing and uses a WYSIWYG format. For the CoCo 3. *Kolesar B/S, 7 Ladd Road, Westfield, PA 16950, (814) 367-5384; $39.95 plus $2 S/H.*

◆ **TEXTFORM**, a menu-driven program designed to format ASCII text files into two-column format. Output may be directed to either a printer or disk file. For the CoCo 1, 2 and 3. *R.A.D. Products, 194 Hotchkiss Street, Jamestown, NY 14701, (716) 665-2124; $34.95.*

◆ **First product received from this company**

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

OWL-WARE

Proven Technology

New CoCo 3 Utilities

Great for 512K Systems! From Color Venture and OWL-WARE

PRINTER LIGHTNING

A great print spooler which gives you 44K print buffer from a 128K CoCo and up to 438K (200 pages!) from a 512K CoCo. With this spooler you can run a program while you are printing a file. The spooler does not slow down the computer to any noticeable extent while you are running a second program and no lost characters arise. Baud rates selectable. ***Printer Lightning*** can reside in memory along with ***RAMDISK***!

RAMDISK

Using 512K CoCo 3 you have access to 2 additional disk drives in RAM. All disk commands are supported, and the data are Reset button protected. You can now have up to 5 disk drive capacities on line at once and can assign the ram disks to any drive number. By making the ramdisk Drive 0, all programs which require a lot of drive access will run much faster. You can have the ***RAMDISK*** in memory at the same time as the ***Printer Lightning***!

BACKUP LIGHTNING

This program is the fastest way to make backup copies of your files using a 512K CoCo. You can backup 35, 40, or 80 track disks single or double sided. Both RS and OS-9 disks may be backed up. The original disk is saved to memory and a copy can be made on an ***unformatted disk*** every 45 seconds! The lightning read, write, format, and verify routines that were developed make this program much quicker that RSDOS or OS-9 for backups. This will become one of your most used programs!

·NEW·NEW· **Only $19.95 each. 3 for $49.95.**

SPECIAL With our 512K Upgrade (Next page) only $2. each or 3 for $5!

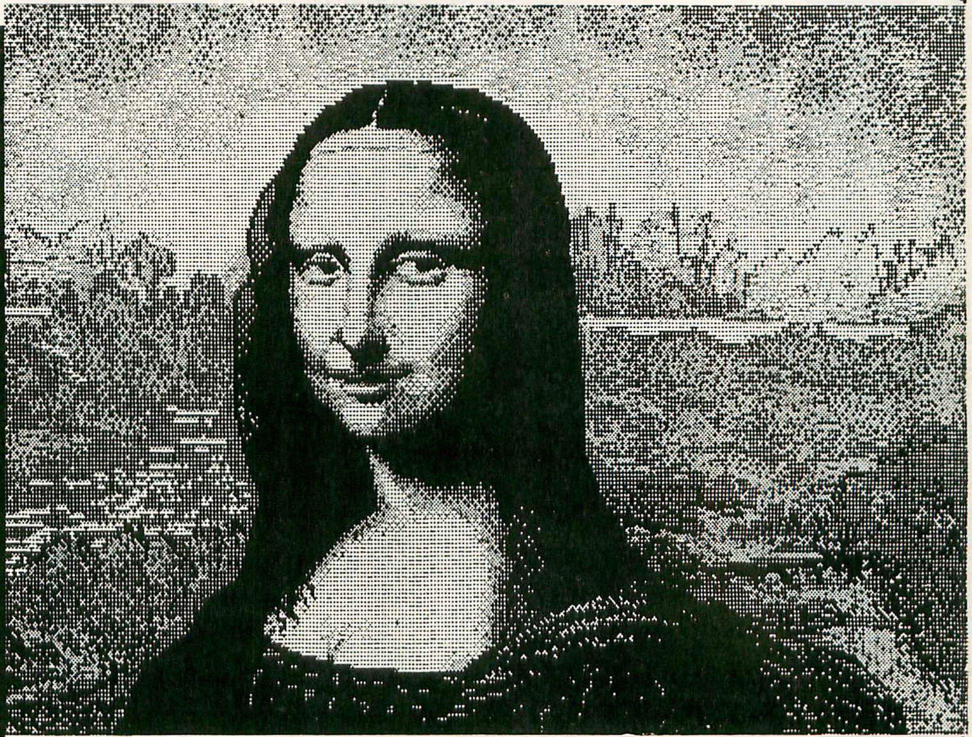
Announcing:

The finest graphics/drawing program for the COCO 3!

Da Vinci 3

- 16 colors on screen at one time
- Modify each color from 64 available colors
- Use composite or RGB monitor
- Draw with custom paintbrushes
- Full resolution 320 X 192
- Picture converter for conversion of COCO 2 pictures to COCO 3
- Multiple text fonts
- Accepts input from joystick, X-pad, mouse, or touch-pad
- Boxes, circles, line, paint generation
- Screen dump for Tandy mono and color ink-jet printers, (NX-10 and others pending)
- Sensible price
- No additional hardware required because of course/fine joystick movement modes
- Zoom mode for individual pixel editing
- Great on screen menu which is removable at the touch of a key to allow full screen edit

128K or 512K COCO 3 $37.95



Super I/O Board for OS-9

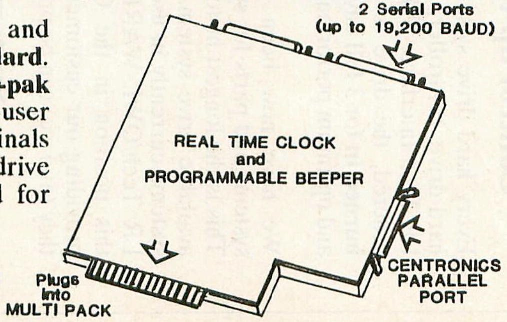
Each Board Provides 2 Serial Ports and Centronics Parallel Port

First Board has Real Time Clock and Beeper... With Second Board up to 5 Users

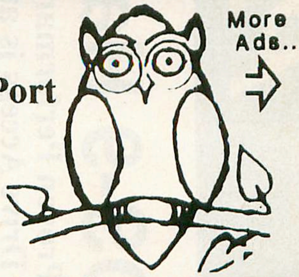
The serial ports are usable **up to 19,200 Baud**, and the parallel port is a **true Centronics standard**. Plug into your multi-pak. **On CoCo 3, multi-pak must be upgraded**. You will have a multi-user system with additional computers or terminals plugged into the serial ports. An OWL hard drive and 512K upgrade are strongly recommended for multi-user systems.

***Intro Price...* $165.**

BOARD 2... $139.



More Ads... ⇨



OWL-WARE

P.O. Box 116-A
Mertztown, PA 19539
— ORDER LINES (only) —
(800) 245-6228
(215) 682-6855 (PA)

Proven Technology

On the Razor's Edge of the Color Computer Frontier

OS-9 Hard Drive Systems

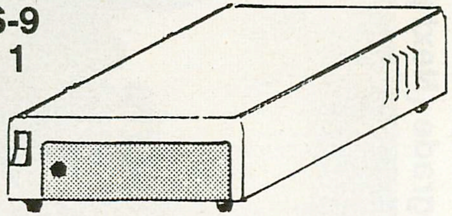
Proven Performance for Demanding Home or Business Use
Drive Access is at *Least 8 Times Faster* than Floppy Drives
Control up to 2 Drives per Controller each as Continuous Storage

Every hard drive system is **complete** with software, hard drive, controller, heavy-duty power supply, and LR Tech Interface. When a complete drive system is ordered, the drive is fully **assembled**, **tested**, and **burned in** for 3 full days. This ensures dependability and optimum performance.

We have now been supplying CoCo hard drive systems and parts for systems for more than 2 years. This is the longest history in the CoCo market of any available drive system. About ¾ of all hard drive systems currently in use in the CoCo market use the LR Tech/OWL-WARE system. We have reached this position in the CoCo hard drive market by providing our customers with a quality product that they (and we) can be proud to own and use.

A number of drive systems were in the market place when the LR Tech Interface was introduced and 2 have been introduced since. Most of these are no longer available. We provide the only system which provides a combination of standard interface (SASI), rugged unit construction (not hacked to a floppy drive controller), high speed, and reasonable price. **These systems are even several times faster than the standard XT hard drive system.** Ideal for multi-user system because processor does not stop for hard drive access.

For OS-9 Levels 1 and 2



System Prices:

$469.	$629.	New! $759.
10 MEG	20 MEG	40 MEG

Dealer's Inquires Invited!

Hard Drive Interface
(Includes Software)

For those who want to put together their own system, we have an exclusive arrangement to distribute the LR Tech Interface. Please note that an interface is not a controller. **A Xebec, WD, or Adaptec SASI controller are required for a drive system.**

To assemble a hard drive system yourself requires some reasonable knowledge of OS-9 and electronic construction and **a hard drive that works.** CoCo 3 users will have to upgrade their Multi-pak.

Only $119.

Xebec Controller $139.

CoCo 3 512K Upgrade

The LR Tech 512K upgrade uses all **gold contacts and 120 nanosecond 256K chips.** Provides large system memory from OS-9 Level 2.

Without Mem Chips $59. **With Chips $112.**

Special! See software offer on previous page.

Hard Drive Basic

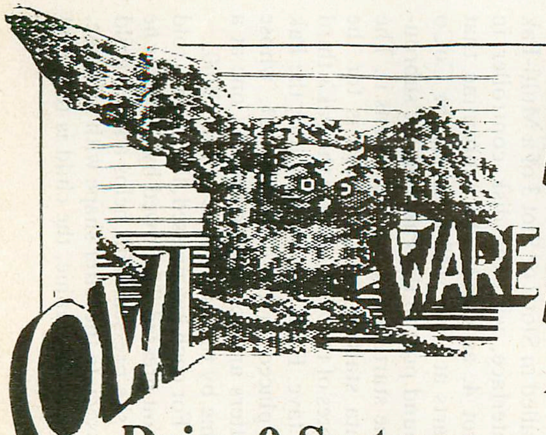
New For the CoCo 3!

In Answer for the Many Reqests to Run BASIC from a Hard Drive

With the development of the CoCo 3, OWL Ware has been able to provide a truly professional Hard Drive System using OS-9. There has not, however, been a method of running your programs from the standard BASIC. With this latest development of the CoCo software aces, it is now possible to partition your hard drive into RSDOS and OS-9 sections. The OS-9 partition runs your OS-9 normally. The RSDOS section is further divided into a number of floppy sized units to run RSDOS programs. The familiar RS disk commands work normally. There is little more that must be learned.

All of these RS drive sections are available at all times. It is not necessary to use assign commands and get access to only a few of these sections. Programs that use RS-BASIC should work as will all programs which do not force their own disk drivers.

Call about prices. This should be availabile by the time you read this ad!



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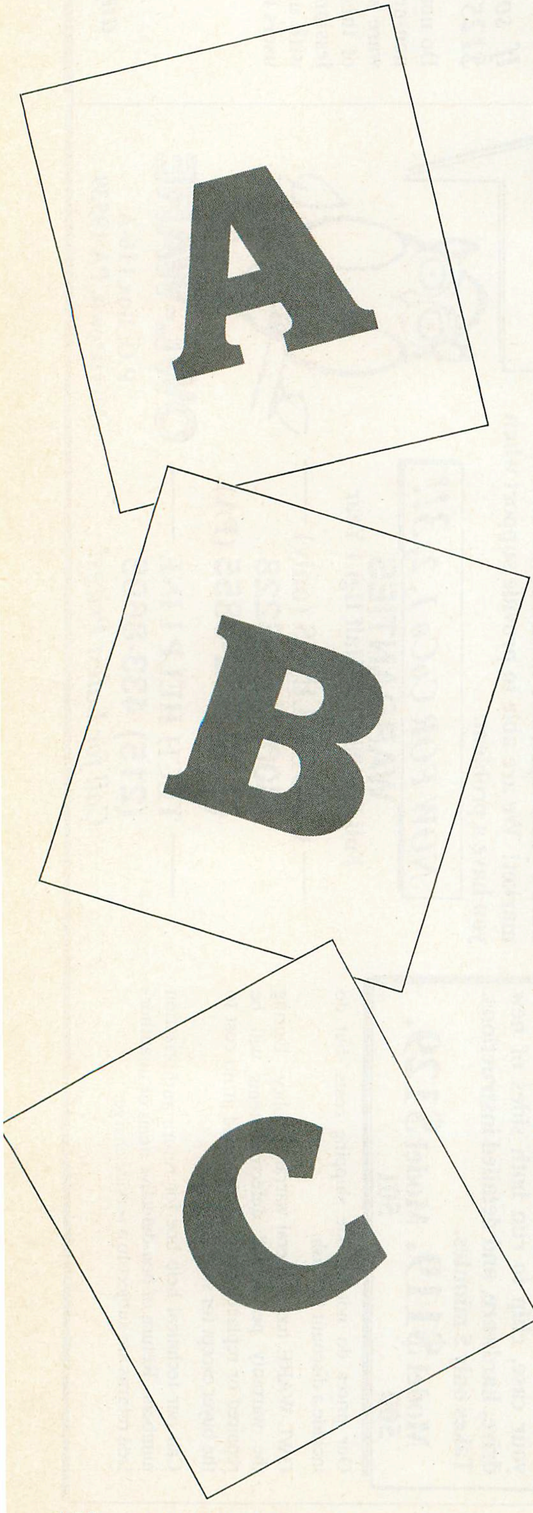
A modification to the ABC educational program



Sounding Out the ABCs

By John M. Linge

September 1987's issue of RAINBOW featured the program *ABC* by Ann B. Mayeux, which helps small children learn the alphabet. My 3-year-old, Regina, loved being able to "type" on the keyboard and get a colorful response with *ABC*.

However, it seemed to me that the program could be enhanced greatly by having the computer speak to her as she pressed the keys. When I scanned the listing, I saw that Mrs. Mayeux had written the program in such a way that I could readily patch it to take advantage of the Tandy Speech/Sound Pak to provide music and speech.

After a bit of trial and error, the program `ABCMRG` resulted. To use it, type in the listing, being careful to use the line numbers shown. The lines fit between the lines of the original program, except the ones I had to rewrite because of a conflict with Pak operation. Also, the apparent misspellings in the program are there purposely — the Speech/Sound Pak does some odd things with the pronunciation of some properly spelled English words, so they must be misspelled in order to be pronounced correctly.

Save the program in ASCII form by entering `SAVE "ABCMRG/BAS",A`. Rename the original *ABC* program as `"ABCOLD/BAS"` in order to retain it in its original form as a backup, then load it and merge the two programs by entering `MERGE"ABCMRG/BAS"`. Save the merged program as `ABC`.

To run the new *ABC* program, you must have a Speech/Sound Pak installed in Slot 2 or Slot 3 of a Multi-Pak Interface, with the disk controller in Slot 4, as usual. The subroutine that starts at Line 3140 redirects the CoCo sound port to the Pak, and the subroutine starting at Line 3000 resets it. The data starting at Line 3230 is for the notes of the *ABC* song in the Pak's third octave. Each item to be said by the Pak is placed in the variable `LG$`, whose letters are poked into the Pak one at a time by the subroutine at Line 3060.

For each key pressed, the child is told "You pressed," followed by the letter he or she pressed. This helps a small child associate the letter shape with its name. For each graphic, the child is told that

As a systems engineer at a major aerospace company, John Linge has worked with a variety of operating systems and languages. At home, he enjoys using his CoCo for personal and family-oriented purposes.

the letter he or she pressed "is for" the graphic shown on the screen. For example, when the child presses A, the computer says, "You pressed A. A is for airplane. A is for alligator. A is for apple." I attempted to have the program identify the object as closely as possible to the drawing of the object without rewriting the drawing routines, which were programmed very well by Mrs. Mayeux.

When Regina asks to type on "Daddy's computer," we load the modified program. She still enjoys the color and immediate feedback of her actions, and she also hears the "robot" speak to her.

(Questions or comments about this modification may be directed to the author at 27 Apple Lane, Commack, NY 11725. Please enclose an SASE when writing for a reply.) ☐

Editor's Note: The modified ABC *program will be placed on this month's* RAINBOW ON TAPE *and* RAINBOW ON DISK *instead of* ABCMRG.

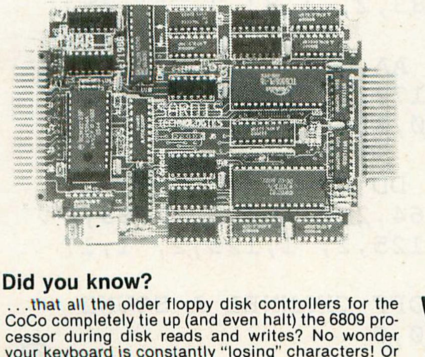
410	163	2405	173
985	70	3160	84
1685	185	END	121

The listing: ABCMRG

```
49 ' PATCHES TO ABC/BAS TO USE S
/SC
50 W=&HFF7D: X=&HFF00: Y=&HFF7E
51 GOSUB 3000
52 POKE Y,&HAF:GOSUB 3170
53 FOR I=1 TO 2
54 READ X1: POKE Y,X1: GOSUB 317
0
55 NEXT I
61 PRINT@384,"MODIFIED FOR S/SC
BY JOHN LINGE";
62 FOR I=1 TO 43
63 POKE Y,8: GOSUB 3170: POKE Y,
0: GOSUB 3170
64 READ X1,X2,X3
65 FOR J=1 TO X3
66 GOSUB 3140
67 POKE Y,0: GOSUB 3170: POKE Y,
X2: GOSUB 3170
68 POKE Y,1: GOSUB 3170: POKE Y,
X1: GOSUB 3170
69 POKE Y,8: GOSUB 3170: POKE Y,
10: GOSUB 3170
70 NEXT J
71 NEXT I
72 POKE Y,8: GOSUB 3170: POKE Y,
0: GOSUB 3170
73 POKE Y,&HFF: GOSUB 3170
74 CLS
135 IF A$>="A" AND A$<="Z" THEN
LG$="YOU PRESSED "+A$: GOSUB 307
0
410 PCLS2: SCREEN1,0
435 LG$="AIRPLAYN": GOSUB 3040
485 LG$="AELLIGAYTOR": GOSUB 304
0
495 LG$="APPLE": GOSUB 3040
510 PCLS: SCREEN1,0
525 LG$="BOWT":GOSUB 3040
545 LG$="BIRD": GOSUB 3040
555 LG$="BALLOONS": GOSUB 3040
590 PCLS:SCREEN1,1
605 LG$="CLOUD": GOSUB 3040
655 LG$="CAR": GOSUB 3040
665 LG$="CAT": GOSUB 3040
680 PCLS:SCREEN1,1
695 LG$="DOOR": GOSUB 3040
725 LG$="DAWGG": GOSUB 3040
735 LG$="DISH": GOSUB 3040
750 PCLS:SCREEN1,1
755 LG$="EXIT": GOSUB 3040
775 LG$="ELEPHANT": GOSUB 3040
820 PCLS2: SCREEN1,0
825 LG$="FRAWG": GOSUB 3040
875 LG$="FLOUERS": GOSUB 3040
900 PCLS:SCREEN1,1
905 LG$="GAYT": GOSUB 3040
955 LG$="GRAPES": GOSUB 3040
985 LG$="JIHRAFF": GOSUB 3040
1020 PCLS: SCREEN1,1
1035 LG$="HELICOPTER": GOSUB 304
```

NEW

DMC "No Halt" Disk Controller



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Our new Dual Mode Controller (DMC) implements a new "no halt" mode of operation so it can read from or write to disk all by itself. The 6809 is freed to process other tasks and respond to interrupts. This is how OS-9 was meant to run! But the Radio Shack "halt" mode of operation is also retained to maintain full compatibility with existing non-OS-9 software.

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Did you know?

...that all the older floppy disk controllers for the CoCo completely tie up (and even halt) the 6809 processor during disk reads and writes? No wonder your keyboard is constantly "losing" characters! Or that your serial port often gives you garbage.

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```
0
1055 LG$="HOUSE": GOSUB 3040
1100 PCLS6: SCREEN1,1
1102 DRAW"BM175,40R25D15L5D81R5D
15L25U15R5U81L5U15":PAINT(185,50
),8,8
1115 LG$="ICE CREAM": GOSUB 3040
1130 PCLS3:SCREEN1,0
1135 LG$="JAK IN THE BOX": GOSUB
 3040
1220 PCLS:SCREEN1,1
1235 LG$="KAEET":GOSUB 3040
1255 LG$="KEY": GOSUB 3040
1325 LG$="KANGUHROO": GOSUB 3040
1340 PCLS3: SCREEN1,0
1345 LG$="LEAVES": GOSUB 3040
1375 LG$="LAYDEYBUG": GOSUB 3040
1410 PCLS: SCREEN1,1
1415 LG$="MOUNTENS": GOSUB 3040
1425 LG$="MAILBOX": GOSUB 3040
1435 LG$="MOON": GOSUB 3040
1490 PCLS: SCREEN1,1
1495 LG$="NEST": GOSUB 3040
1525 LG$="NIGHT": GOSUB 3040
1560 PCLS: SCREEN1,1
1565 LG$="AOUL": GOSUB 3040
1615 LG$="OTION": GOSUB 3040
1635 LG$="OCTOWPUS": GOSUB 3040
1680 PCLS: SCREEN1,1
1685 LG$="PICTURE": GOSUB 3040
1695 LG$="PUMPKIN": GOSUB 3040
1715 LG$="PAPER": GOSUB 3040
1725 LG$="PENCIL": GOSUB 3040
1780 PCLS: SCREEN1,1
1785 LG$="QUILT": GOSUB 3040
1825 LG$="QUEEN": GOSUB 3040
1890 PCLS3: SCREEN1,0
1905 LG$="ROCKET": GOSUB 3040
1955 LG$="RAINBOW": GOSUB 3040
1975 LG$="RABBIT": GOSUB 3040
2020 PCLS3: SCREEN1,0
2025 LG$="SUN": GOSUB 3040
2045 LG$="SIGN": GOSUB 3040
2055 LG$="SNAKE": GOSUB 3040
2085 LG$="STREET": GOSUB 3040
2100 PCLS: SCREEN1,0
2115 LG$="TRUCK": GOSUB 3040
2145 LG$="TREE": GOSUB 3040
2190 PCLS3: SCREEN1,0
2205 LG$="UMBERELLA": GOSUB 3040
2250 PCLS: SCREEN1,1
2255 LG$="VYIOWLIN": GOSUB 3040
2315 LG$="VAZE": GOSUB 3040
2335 LG$="VYOWLETS": GOSUB 3040
2360 PCLS2: SCREEN1,0
2365 LG$="WIHNDOW": GOSUB 3040
2405 LG$="WATERMELON": GOSUB 304
0
2440 PCLS2: SCREEN1,0
2445 LG$="XYLOWPHONE": GOSUB 304
0
2490 PCLS2: SCREEN1,0
2535 LG$="YELLOW YARN": GOSUB 30
40
2550 PCLS: SCREEN1,1
2585 LG$="ZEEBRA": GOSUB 3040
2605 LG$="ZOO": GOSUB 3040
3000 ' INITIALIZE S/SC
3010 GOSUB 3140
3020 POKE W,1:GOSUB3170: POKE W,
0:GOSUB3170
3030 RETURN
3040 ' SET UP LEGEND FOR KEYPRES
S
3050 LG$=A$+" IS FOR "+LG$
3060 ' SAY LEGEND
3070 POKE X+1,52: POKE X+3,63: P
OKE X+35,60
3080 FOR I=1 TO LEN(LG$)
3090 POKE Y,ASC(MID$(LG$,I,1)):G
OSUB 3170
3100 NEXT I
3110 POKE Y,13:GOSUB3170
3120 FOR DL=1 TO 1000:NEXT DL
3130 RETURN
3140 ' SET UP S/SC
3150 POKE X+1,52: POKE X+3,63: P
OKE X+35,60
3160 RETURN
3170 ' CHECK FOR S/SC READY
3180 IF PEEK(Y) AND 128 = 0 THEN
 3180
3190 RETURN
3200 ' ABC SOUND DATA
3210 ' ENABLE CHANNEL A ON MIXER
3220 DATA 7,254
3230 ' ABC SONG DATA
3240 ' CC GG AA G
3250 DATA 1,172,2, 1,172,2, 1,29
,2, 1,29,2, 0,254,2, 0,254,2, 1,
29,4
3260 ' FF EE DDDD C
3270 DATA 1,64,2, 1,64,2, 1,83,2
, 1,83,2, 1,125,1, 1,125,1, 1,12
5,1, 1,125,1, 1,172,4
3280 ' GG F EE D
3290 DATA 1,29,2, 1,29,2, 1,64,4
, 1,83,2, 1,83,2, 1,125,4
3300 ' GGG F EE D
3310 DATA 1,29,1, 1,29,1, 1,29,1
, 1,64,4, 1,83,2, 1,83,2, 1,125,
4
3320 ' CC GG AA G
3330 DATA 1,172,2, 1,172,2, 1,29
,2, 1,29,2, 0,254,2, 0,254,2, 1,
29,4
3340 ' FF EE DD C
3350 DATA 1,64,2, 1,64,2, 1,83,2
, 1,83,2, 1,125,2, 1,125,2, 1,17
2,6
3360 ' TURN OFF CHANNEL A SOUND
3370 DATA 0,0,0
```

TEXTPRO-IV

"The ULTIMATE Color Computer III Word Processing System"

9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
Screen Display of Bold, Italic, Underline & Double Width print.
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TEXTPRO IV is the most Powerful Word Processing System available for the COCO-3, designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other hort documents, and never expect to use multiple fonts or proportional printing, hen most likely you'll be better off with one of the other simple word processors. But, if you want a powerful word processor with extensive document formatting eatures to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is the answer. It works in a otally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting nformation that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time comsuming and frustrating menu chases, you are in total control at all times. You can display the formatted document on the screen before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts. ake a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All of the character sets used on this AD are proportional, all centering, justification, font selection, and text printing was performed automatically by TEXTPRO IV.

What you see is what you get!

TEXTPRO IV has 9 Hi-Resolution screen fonts to choose from, with 58 to 212 characters per line in 225 Resolution, for the best display possible. You can easily match the width of your printed page to the screen and you can have it automatically change display widths as you change printer fonts so you can even display the "fine print". All of the screen fonts can display, Bold, Italic, Underline, Superscript, Subscript and Double Width characters. When you you want to see what your printed document will look like, TEXTPRO IV will let you see it on the screen in all its glory, so that, "What you see is what you get".

Standard Commands

TEXTPRO IV has all the document formatting commands you expect in a word processor and then some. The setup commands include: line length, top margin, bottom margin, page length, page numbering on/off, page format on/off, automatic word fill on/off and justification left, center, right or full. Some of the Vertical control features include: Test for a number of lines left on a page, skip to next page, set page number, page pause, single and multiple line spacing.

TEXTPRO IV features 3 programmable Header lines that can be centered, left or right justified and one programmable Footer line. There are 3 commands for continious, single and paragraph indenting, Center Text, Center Line and Right Justify text with character fill.

Printer & Special Commands

TEXTPRO IV has 8 pre-defined printer & screen commands for Bold, Italic, Double Width, Underline, Subscript, Superscript, Condensed and Double Strike print. It also has 10 programmable functions that you can use to access intelligent printer features like: Graphics, variable line spacing, half line feed, horizontal & vertical positioning. There are also 3 other printer commands that allow you to imbed control code sequences anywhere in the text.

There is a Footnote command that will automatically place footnotes at the bottom of the page. Another command allows you to display a message on the screen and input text from the keyboard, to be included in your printed document. There is also a repeat command that allows you to repeat an entire document or part of one, up to 255 times.

Tab Functions

TEXTPRO IV features an elaborate system of tab commands for complete control over column formatting. There are 10 programmable tab stops that can be defined and re-defined at any time. They can be used to: Center over Tab column, Right Justify to Tab column, Decimal Align over Tab column, Left Justify to Tab column (Normal Tab) and Horizontal Tab. They can also be used with a numeric column position for maximum flexibility.

Proportional Fonts & Printing

TEXTPRO IV is the only Color Computer III Word Processing system that gives you Justified Proportion Printing, which can give your documents and letters that professional touch that just isn't obtainable with fixed or mono spaced printing. And just about all printers today support proportional fonts, and with Laser Printers you can get typesetting quality output for just pennies a page. TEXTPRO IV supports up to 9 proportional fonts, with full justification. And, you can even mix mono spaced and proportional fonts for maximum flexability. Even if you don't use proportional printing, you can select between Pica, Elite and Condensed fixed width fonts to get fully justified printing.

Mail Merge and Text Processing Disk Functions

TEXTPRO IV supports several commands that allow you to import data or text from other disk files. They allow you to include information like names and addresses for Mail Merge capability, Import standard paragraphs or other information for Boiler Plate type functions and more. Some of the commands include: Open a file, Field a Record, Read a Record into fielded variables, Read single or multiple lines and Trim spaces from the trailing end of fielded variables.

Another powerful disk function not to be overlooked is the "LIBRARY" command that allows you to include the entire contents of a file in your text. This can be very useful for a great many applications. You can use a Library command to automatically include a standard or optional printer setup command file, or to include standard paragraphs, headers or information created from a spread sheet or any other program. And, for printing very large documents that consist of several files linked together.

Autoexec Startup Files

TEXTPRO IV will automatically load and execute a command text file when it first executes. This allows you to customize the program configuration for your system and printer whenever you startup TEXTPRO IV. You can setup the screen display format, colors, adjust automatic key repeat, printer baud rate, load a set of function keys, load your printers control codes and more.

80 Programmable Function Keys

TEXTPRO IV allows you to have up to 80 function keys with just about any kind of information or command sequences you can imagine. Once programmed, you can have a command sequence execute using a single function key. You can also Save and Load function key sets at any time. So, you can have several sets for different writing tasks or projects, the possibilities are endless. Just think, with a single function key you could, load a disk file, search for and replace all the occurances of a phrase, save the file back to disk, have it processed and printed!

Text Editing

TEXTPRO IV has a powerful, full featured, line oriented screen editor that is faster and more efficient then most editors you've ever worked with. It supports single or multiple line copy and move, global or local search and replace, word and character insert/delete, block delete and much more. It features adjustable automatic key repeat, selectable display foreground and background colors, screen line width and more.

TEXTPRO IV uses fully compatible ASCII formatted files. You can even direct formatted output files to a standard ASCII disk file. It will Load, Save, Append, Kill, Text Process files from disk, Roll part of a file to disk, Get next portion of a file, display a Directory and Backup Ramdisk to & from Floppy disks.

TEXTPRO IV's files are also compatible with spelling checker programs like Spell 'n Fix from Star Kits, a shareware program, available with TEXTPRO IV for your evaluation, just for the asking.

Fully Buffered Keyboard

While many word processing programs are slow and often lose keystrokes. TEXTPRO IV has a fully buffered keyboard that is virtually impossible to out type. Even when it's busy, it will still remember the keystrokes entered. You can enter in commands or whatever, even during insert mode you'll never lose a key.

Professional Word Processing Power

TEXTPRO IV is a powerful tool for both the Casual and Professional Word Processing user. It offers a wide range of features and functions that can satisfy even the most demanding writer. Even though you may not need all of TEXTPRO IV's power and flexability right now, its not a program that you can easily outgrow. As your needs and skills improve, you'll discover that you won't need to go out and buy another word processing program, TEXTPRO IV will already be ready and waiting. No Text Processing program available for the Color Computer III gives you more Text Processing Power than TEXTPRO IV. It can make your writing appear more professional than you ever thought possible. Check around, see what other word processing programs have to offer in terms of power, speed and flexability. When your finished comparing them against TEXTPRO IV, you'll see that it's the only real choice for the Color Computer III.

Requires 128K & Disk $89.95

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Coming Soon: CoCo 1 & 2 versions of TEXTPRO IV

Delphi's Online Debate Team

By Cray Augsburg
Rainbow Technical Editor

BattleLine Topic No. 1 was announced in mid-October by **Greg Miller** (GREGMILLER) with this question: *Does the high cost of software make piracy just?* Several people took the opportunity to put in their two bits, and it is interesting to note that few users took the position that high software prices justify piracy.

For those new to the game, "BattleLine" refers to the discussion of controversial topics on Delphi. These topics are chosen and announced about once a month, and all users are invited to join in and let their opinions be known. To participate, send your messages in Forum. Also, stick around for the open conference that's held toward the end of the BattleLine period.

If you missed anything, don't worry — all Forum messages and a complete log of the resulting conference will be placed in the Archives area of the database for later perusal by any SIG member. The archive of the piracy BattleLine is there now. Be forewarned, however, that the information is over 100K in size. The main archive file has been broken into several smaller files, which should help those whose terminal programs don't support direct-to-disk file transfers.

As the size of the archive file implies, the first BattleLine seemed to go quite well. Several users responded to the chosen topic and aired their thoughts and feelings. All in all, not too many low blows were thrown (although it might help to see more of these!).

If the topic interests you, download the appropriate files. You can still respond to the issue — kick it around some more and see what you come up with. Nothing says we can't pick the same (or a closely related) topic twice.

We expect the number of users to increase as BattleLine continues. It is part of human nature to want to join in. And the best part of the "battle" is that if you disagree with someone else, you can't get punched in the nose! BattleLine won't leave any casualties; rather, it can help us all to understand the impact of certain topics.

By the way, BattleLine topics are not limited to computer-related discussion only. If you have ideas for BattleLine, any "hot" thoughts in your heart or mind, let them be known. Send a Forum message to Greg Miller, who will spread the word among the staff, which will then choose a topic. You should keep in mind that in these infant stages of BattleLine we are learning to better serve you as members of the SIG. We need your feedback to make this work.

Resource to Delphi

We just received our copy of the new book *DELPHI: The Official Guide*. This book, written by **Michael A. Banks** (KZIN) of the Science Fiction SIG, is 487 pages long and literally jammed with information about Delphi. The information contained in the book is broken into four parts:

Getting Started covers the basics of telecommunications. It also details the basics of the Delphi menu and command systems, ending with a presentation and discussion of the Delphi Main Menu selections.

The DELPHI Member Handbook explains in its 16 chapters major aspects of how to utilize Delphi to the fullest. Topics covered include Business & Finance, Conference, DELPHI Mail,

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Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

Database Report

By Don Hutchison
Rainbow's Delphi Database Manager

Both OS-9 Online and the CoCo SIG have been very busy since the October Princeton RAINBOWfest. Many users purchased software at the 'fest and are now using it to produce utilities, pictures and other programs that they wish to share with the CoCo population. Our uploading activity following the 'fest was extremely lively! We even uploaded one very popular file, `CoCo3FIX.BAS`, from the 'fest!

OS-9 Online

In the General Information topic area, **Jim Johnson** (REINDEER) uploaded a "typewriter graphic" file that describes how to convert 3½-inch disk drive connectors to the type used by 5¼-inch drives. This file is of importance to OS-9 users because his modifications will allow 3½-inch drives of the 720K double-sided, 80-track variety to be used with the existing CoCo disk controller circuitry. **Jim Manning** (JIMBM) uploaded a program that enables booting with 80 columns and using the VDG screen in another window. **Greg Law** (GREGL) sent us a shell script file to merge `BASIC09` and `RUNB` with `SYSCALL`, `INKEY` and `GFX2` to alleviate the popular Error #043. **Rix Seacord** (RIX) gave us a review of the new "no halt" DMC controller from Sardis Technology.

In the Programmers Den topic area, Greg Law uploaded a total of eight routines. Included are a CRC checksum calculation routine for Xmodem/Ymodem, a day of the week calculator, a reverse string routine, a Julian date calculator, integer to ASCII (and vice versa) routines, an ASCII to double precision routine, and a C program for executing any OS-9 system call directly from the command line. The

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Don Hutchison is an electrical engineer and lives in Atlanta, Georgia. He works as a senior project engineer involved in the design of industrial control systems. On Delphi, Don is the Database Manager of the RAINBOW CoCo SIG. His Delphi username is DONHUTCHISON.

*** *** *** *** COLOR COMPUTER III SOFTWARE *** *** *** ***

CBASIC III EDITOR/COMPILER

The ULTIMATE Color Computer III BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC III is the answer!!!

CBASIC III is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer 3. It will allow you to take full advantage of all the capabilities available in your CoCo-3 including 512K RAM, without having to spend years trying to learn assembly language programming. CBASIC III allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly. CBASIC III supports all the enhanced hardware available in the CoCo-3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts (Keyboard, Timer, Serial & Clock). We even added advanced commands not available in Basic to give you a level of control only avialable to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC III is the friendliest and easiest compiler available for the Color Computer III.

CBASIC III is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocations and so on, because CBASIC III will handle it for you automatically. For Advanced users, CBASIC III will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC III features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/Put, H/Play and H/DRAW, all with 99.9% syntax compatibility. CBASIC III also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with easy to use PRINT, INPUT, INKEY, GETCHAR and PUTCHAR commands.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximatly 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

Requires 128K & Disk $149.00

DATAPACK III PLUS V1.1

SUPER SMART TERMINAL PROGRAM

AUTOPILOT & AUTO-LOG PROCESSORS
X-MODEM DIRECT DISK FILE TRANSFER
VT-100 & VT-52 TERMINAL EMULATION

- No lost data even at 2400 Baud on the COCO-3 Serial I/O port.
- 8 Display Formats, 32/40/64/80 columns at 192 or 225 Res.
- 50K Text Buffer when using the Hi-Res Text Display & Disk.
- ASCII & BINARY disk file transfer support via XMODEM.
- Directly record receive data to a disk file (Data Logging).
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys, position, insert/delete, PF & Alt. keys.
- Programmable Word Length, Parity, Stop Bits and baud rates.
- Complete Full and Half Duplex operation, with no garbled data.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 baud.
- Send Files directly from the Buffer, Macro Keys or Disk.
- Display on Screen or Print the contents of the Buffer.
- Freeze Display & Review information On Line with no data loss.
- Built in Command Menu (Help) Display.
- Built in 2 Drive Ramdisk for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128K & Disk, $59.95

EDT/ASM III

128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground or background colors or even monochrome display modes. It will even support 512K by adding an automatic 2 drive Ultra Fast Ramdisk for lightning fast assembly of program source code larger than memory. There is also a free standing ML Debug Monitor, to help you debug your assembled programs. EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Supports Local and Global string search and/or replace.
- Full Screen line editing with immediate line update.
- Easy to use Single keystroke editing commands.
- Load & Save standard ASCII formatted file formats.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler portion of EDT/ASM III features include:

- Supports the full 6809 instruction set & cross assembles 6800 code.
- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file (include) up to 9 levels deep.
- Supports standard Motorola assembler directives.
- Allows multiple values for FCB & FDB directives (unlike R.S. EDT/ASM)
- Allows assembly from the Editor Buffer, Disk or both.

Requires 128K & Disk $59.95

TEXTPRO IV

"The ADVANCED COCO-3 Word Processing System"

- 9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
- On Screen Display of Bold, Italic, Underline & Double Width print.
- Up to 8 Proportional Character Sets Supported with Justification.
- Up to 80 Programmable Function Keys & Loadable Function key sets.
- Fully Buffered keyboard accepts data even duiring disk access.
- Autoexecute Startup files for easy printer & system configuration.
- 8 Pre-Defined Printer function commands & 10 Programmable ones.
- Supports Library files for unlimited printing & configurations.
- Disk file record access for Mail Merge & Boiler Plate printing.
- Completely Automatic Justification, Centering, Flush left & right.
- Change indents, margins, line length, etc. anytime in the text.
- Create and Edit files larger than memory, up to a full disk.
- Easily imbed any number of printer format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is the most advanced word processing system available for the COCO-3, designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional spacing, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is what your looking for. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time comsuming, and often frustrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128K & Disk $89.95

HI-RES III Screen Commander

The DISPLAY you wanted but didn't get on your CoCo-3

- 54 Different Character Sizes available from 14 to 212 cpl.
- Bold, Italic, Underline, Subscript, Superscript and Plain character styles.
- Double Width, Double Height and Quad width characters.
- Scroll Protect form 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN 3 mode.
- PRINT @ is available in all character sizes & styles.
- Programmable Automatic Key repeat for fast editing.
- Full Control Code Keyboard supported.
- Selectable Character & Background color.
- Uses only 4K of Extended (2nd 64K) or Basic RAM.
- Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example, you can't use PRINT @ or have different character sizes on the same screen, even when mixing text and graphics with the HPRINT command. Hi-RES III can give you the kind of display you always dreamed about having on your CoCo-3, with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. With the full control code keyboard, you can control many of HI-RES III extended functions with just a couple of simple keystrokes.

Requires 128K Tape or Disk $34.95

512K RAMDISK & MEMORY TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in you CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk $19.95

"The SOURCE III"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE III will allow you to easily Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler compatible Source code.

- Automatic label generation and allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk, unlike other disassemblers.
- Automatically locates Begin, End and Execution address.
- Output Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler source files directly to disk or printer.
- Built in Hex/Ascii dump/display to locate FCB, FCC & FDB areas.
- 8 Selectable Display formats 32/40/64/80 columns in 192 or 225 Res.
- Selectable Foreground & Background colors & Printer Baud rates.
- Built in Disk Directory an Kill file commands.
- Menu display with single key commands for smooth, Easy operation.
- Written in Ultra Fast Machine Language.

Requires 128K & Disk $49.95

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Electronic Mail, Entertainment, Groups and Clubs, People on DELPHI, Workspace, Using DELPHI, HELP and Using the OnlineText Editors.

DELPHI Users Guide describes various shortcuts you can use to maximize the benefits of using Delphi. Applications of Delphi to your personal and business life are covered, as well.

Reference contains four appendices: Index to DELPHI Services, DELPHI Membership Agreement, Troubleshooting and Dial-Up Guide (access numbers for Tymnet, Telenet and Datapac).

DELPHI: The Official Guide is well-written and well-organized. The information is presented in a logical manner and is, therefore, very useful for the beginning, intermediate or advanced user. The book, which can be ordered online, costs $19.95. To order online, first go to the Delphi Main Menu. Select Using-DELPHI and then Manuals. Finally, choose Order DELPHI Guide and answer the questions appropriately. We think you will appreciate the value of the book as well as the effort Mr. Banks has put forth to ensure the clarity, accuracy and completeness of the information it contains. ☐

program will perform the system call requested, give a dump of all the registers, and then exit with the status code indicated from the system call itself.

In the Users Group topic area, **Dennis Weldy** (OS9ER) provided `DL.ASM`, a deleting utility that accepts names from a pipe; `DISKID`, which allows the user to rewrite the disk name and date on a disk after `BACKUP` has overwritten it; `DISKCAT.B09`, a BASIC09 utility to print a hierarchical directory of a disk to the printer; `DIRW.C`, for providing directories with wild cards; and `DIR.ASM`, a directory utility for 64-column screens.

In the Utilities topic area, Greg Law provided `ECH`, a slightly different version of `ECHO` that accepts control characters on the command line. **Rick Adams** (RICKADAMS) provided an updated `CC2` command for use with the C compiler package that combines the `C.PREP`, `C.PASS1`, `C.PASS2` and `C.OPT` steps via pipes.

In the Telcom topic area, **Bob Montowski** (GRAPHICSPUB) uploaded the BASIC09 BBS package that he used formerly. **Bill Brady** (WBRADY) sent us `BT`, a simple terminal program written in BASIC for those who have an Atari ST and only the personal pak.

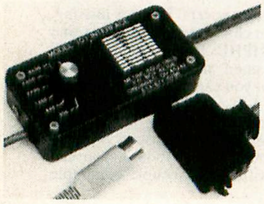
In the Graphics & Music topic area, **Pat Abramovitch** (HUBBS) uploaded a program that draws a "512K on board" sign on a 40-column graphics screen. (He says he was inspired by Rick Adams' *Rickeyterm* macros.) **Toni Ryan** (TNTRHODAN) sent us a new 512K version of his popular *BDraw* program, written in BASIC09. **Steve Clark** (STEVECLARK) provided us with his *MacPaint* picture display and print utility for Level II. He included documentation as well as the C source code. Rick Adams gave us a `WLABEL` command that will put a Macintosh-style window label at the top of all your windows. Rick also uploaded a `COLOR` command for Level II, including C source code.

CoCo SIG

In the General Information topic area, **Kevin Nickols** (NICKOLS) posted the Tandy newsletters for September and October. **Marty Goodman** (MARTYGOODMAN) posted his report on RAINBOWfest. I provided a patch for the CoCo 3 demo program from Spectral Associates that provides enhanced disk performance for those with high-performance drives.

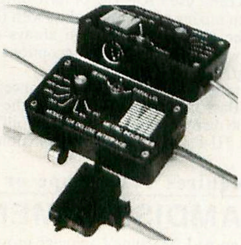
In the CoCo 3 Graphics topic area, **David Mills** (DAVIDMILLS) uploaded his picture of the White House, which won first prize in November's CoCo Gallery. **Mark O'Pella** (MDODELPHI) sent us his `KALISCOP.BAS` program. **David Tilman** (DAVIDTILMAN) provided us with some nifty palette animation and preset motion

Model 101 Interface $39.95



- Serial to parallel interface
- Works with any COCO
- Compatible with "Centronics" parallel input printers
- 6 switch selectable baud rates 300-600-1200-2400-4800-9600
- Small size 4.5" x 2.5" x 1.25"
- *Comes complete* with cables to connect to your computer and printer

Model 104 Deluxe Interface $51.95

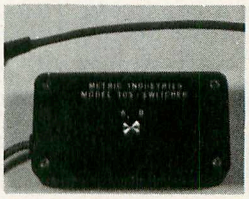


Same features as 101 plus
- Built in serial port for your modem or other serial device
- Switch between parallel output and serial output
- Size is 4.5" x 2.5" x 1.25"
- Comes complete with cables to connect to your computer and printer

Model 102 Switcher $35.95

- Connect to your COCO serial port and have 3 switch selectable serial ports
- Color coded indicator lights show switch position
- Lights also serve as a *power on* indicator for your COCO
- Heavy guage blue anodized aluminum cabinet with non-slip rubber feet

Model 105 Switcher $14.95



- Connects to your COCO to give you 2 switch selectable serial ports
- 3 foot cable to connect to your COCO's serial port
- The perfect item to use to connect a printer and a modem to your COCO
- Small in size, only 4.5 x 2.5 x 1.25

Cassette Label Program $6.95
- New Version - tape transferrable to disk - save and load labels from tape to disk
- Prints 5 lines of information on pin-feed cassette labels
- Menu driven, easy to use
- Standard, expanded and condensed characters
- Each line of text automatically centered.
- Label display on CRT, enabling editing before printing
- Program comes on tape and is supplied with 24 labels to get you started
- 16K ECB required

Other Quality Items

High quality 5 screw shell C-10 cassette tapes. **$7.50/dozen**

Hard plastic storage boxes for cassette tapes. **$2.50/dozen**

Pin-Feed Cassette Labels
White **$3.00/100**
Colors **$3.60/100** *(specify* red, blue, yellow, tan)

NEW! Cables for your COCO
- U.L. listed foil-shielded cable
- 2 Types: male/female extension cables (used between a serial device and existing cable) male/male cables (used between two serial devices such as a modem and one of our switchers).
- 3 ft./$3.95, 6 ft./$4.49, 10 ft./$5.59 Specify M/M or M/F and length.

The 101 and 104 require power to operate. Most printers can supply power to your interface. (Star, Radio Shack and Okidata are just a few that do - Epson and Seikosha do not). The interfaces can also be powered by an AC adaptor; Radio Shack model 273-1431 plugs into all models. If you require a power supply, add a "P" to the model number and add $5.00 to the price. (Model 101P $44.95, Model 104P $56.95).

The Model 101, 102, 104 and 105 work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Itoh, Seikosha, Panasonic and many others. They support BASIC print commands, word processors and graphic commands.

We manufacture these products - dealer inquiries are invited.

Ordering Information

Free shipping in the United States (except Alaska and Hawaii) on all orders over $50.00. Please add $2.50 for shipping and handling on orders under $50.00.
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Cincinnati, Ohio
45242

utility programs. I uploaded MGE pictures of two lovely ladies, and a picture of Lonnie Falk for contrast. **Jason Forbes** (COCO3KID) gave us some more converted Atari ST pictures and a program to display two-dimensional fractal designs. **Jeff Butler** (JEFFBUTLER) sent us his MGE-to-CM3 converter utility. **Bruce Farrington** of Computize (BFCOMPUTIZE) kindly provided the *Color Max Deluxe* cycling demos that he used at RAINBOWfest (these were uploaded at the request of several 'fest-goers). **Bob Montowski** (GRAPHICSPUB) became very popular with the male SIG members this month by providing 24 digitized Playmate pictures. **Ana Landa** (ANA) provided several Halloween pictures that were converted from her original `PMODE 4` drawings. **Craig Luecke** (LUECKE) uploaded two pictures in the new GIF format, since *Color Max* is now capable of reading this format. Craig also sent us his clip set of vegetables and fruits and a *21 Jump Street* calendar. **Richard Trasborg** (TRAS) uploaded a Playmate picture, the entire *CoCo Max III* demo disk, his first cycling picture (called "Snake") drawn under *CoCo Max III*, and the second in his series of "Coloring Book" pictures. Richard also uploaded an erotic picture called "Marabel," which was originally drawn by Mike Trammell. **Michael Schneider** (MSCHNEIDER) provided `MAX.MGE`, a few adult MGE pictures, and a picture of Albert Einstein.

In the Classic Graphics topic area, Jason Forbes uploaded a program that displays two-dimensional fractal designs.

In the Source for 6809 Assemblers topic area, **Roger Krupski** (HARDWAREHACK) uploaded a CoCo reader for the Speech and Sound Pak, and a "remote host" utility. I provided a high-speed utility for comparing two machine language disk files.

In the Utilities & Applications topic area, Michael Schneider uploaded the *Spell 'n Fix* programs. **Kurt Stecco** (HIGHRAILER) uploaded a program for the CoCo 3 that will print gift certificates on a DMP printer. I uploaded a program of patches for the CoCo 3 DOS that was given to me at RAINBOWfest by its author, Vernon Nemitz.

In the Hardware Hacking topic area, **Randy Poppe** (RPOPPE) provided us with the schematic diagram for the Hi-Res joystick input module used by *CoCo Max III*. The file is in the form of a *CoCo Max III* picture file. **Paul Schmidt** (PAULK9PS) sent us instructions concerning converting the Deluxe RS-232 pack to modem pack addressing. Jim Johnson provided two informative hardware articles. The first one described how to convert the data and power connectors for 3½-inch disk drives to the type of connectors used by the older 5¼-inch drive systems. This information is of particular value because once the matter of the different connectors is fixed, 3½-inch drives of the 720K double-sided, 80-track variety will work with the existing CoCo disk controller circuitry. Jim's second article provided information concerning the new model No. 26-3124 multipack in the form of a "typewriter graphic" schematic. I provided a file that describes some cautions and advice for those who may be considering installing a second phone line for exclusive use with their computer.

In the Music & Sound topic area, **Mark Raphael** (MARKRAPHAEL) sent us two more *Musica* files, *Sunny Side* and *Rainy Day*.

In the Games topic area, David Tilman sent us two games, `HAVA1` and `HAVA2`.

In the Data Communications topic area, **Mike Andrews** (MANDREWS) uploaded a patch for Version 2.0 of *Rickeyterm* that provides Ymodem downloading capabilities. Delphi supports the efficient Ymodem protocol, so this patch is sure to be popular among *Rickeyterm* users. **Gerry Thomas** (INET191) uploaded the documentation file for *Ultimaterm*.

As you can see, we have a lot of new and very good material online for our CoCo users. See all of you online on Delphi!

Hardware
Special
Communications Package

300/1200 baud Fully Hayes compatible Modem - 2 Year Warranty
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[Modem & Cable]

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[Modem & Cable]

Software

'KEEP-TRAK' General Ledger Reg. $69.95—Only $39.95
"Double-Entry" General Ledger Accounting System for home or business: 16k, 32k, 64k. User-friendly, menu-driven. Program features: balance sheet, income & expense statement [current & 'YTD'], journal, ledger, 899 accounts [2350 entries on 32k & 64k [710 accounts & entries on 16k] [disk only]. Version 1.2 has screen printouts.
Rainbow Review 1.1 - 9/84 : 1.2-4/85

"OMEGA FILE" Reg. $69.95—ONLY $24.95
Filing data base. File any information with Omega File. Records can have up to 16 fields with 255 characters per field [4080 characters/record]. Sort, match & print any field. User friendly menu driven. Manual included [32k/64k disk only].
Rainbow Review 3/85. Hot CoCo 10/85

BOB'S MAGIC GRAPHIC MACHINE
Can generate BASIC code to use in your programs. Easy drawing and manipulation of circles, elipses, boxes, lines and ARCS. Single joystick operation with on line HELPS at all times. Allows text on the graphics screen & movement of objects on the screen. Can be used as a stand-alone graphics editor. Instruction Manual. **GRAPHICS EDITOR. REG. $39.95—ONLY $24.95** for disk or tape. 64k ECB.
Rainbow Review 7/85, Hot CoCo 9/85 **"The graphics bargain of the year"**

'KEEP-TRAK' Accounts Receivable.
Features: auto interest calculation, auto ageing of accounts, installment sales, total due sales, explanation space as long as you need, detailed statements, 'KEEP-TRAK' General Ledger tie in, account number checking, credit limit checking & more. User friendly/menu driven. Includes manual. **$39.95** or **$49.95** General Ledger & Accounts Receivables. [Disk Only].

'COCO WINDOWS'
With hi-res character display and window generator. Features an enhanced key board [klicks] and 10 programmable function keys. Allows the user to create multiple windows from basic. Includes menu driven printer setup and auto line numbering. Four function calculator, with memory. The above options can be called anytime while running or writing in BASIC. APPLE PULL YOUR DRAPES. YOU DON'T WANT TO SEE THIS. **$24.95** [disk or tape] includes manual.

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Build an . . .

Electronic EPROM Emulator Eraser

By Tony DiStefano
Rainbow Contributing Editor

In the September 1987 issue of RAINBOW (Page 150), I wrote an article on how to build an EPROM emulator using a RAM chip backed up with a battery. That was all well and good, and I thought that was the end of that. But it wasn't. A reader called me up and told me about his problem with the emulator — he had a problem erasing it.

A regular EPROM has a specific method of erasing — you need an EPROM eraser. All EPROMs have a window on top that allows you access to the chip's memory cells. Exposing that window to ultraviolet light erases all data in the EPROM.

When an EPROM is new, and every time you erase it, the EPROM memory cells contain "logical 1"; or, in the case of an eight-bit EPROM, a Hex value of $FF (that is, eight logical high levels). When you program an EPROM, the logical 1 changes to a logical 0. And there is only one way the programmer can change that cell back to a logical 1 — use an eraser.

Since the chip I used was a RAM instead of an EPROM, my EPROM emulator had no window. You could not erase it with an EPROM eraser, but that did not seem to be a problem. Unlike an EPROM, a RAM chip cell can be changed to a logical 1 just by writing to it. In most cases, all you had to do was plug the RAM-based EPROM emulator and run the programmer software. No problem, the emulator was programmed.

There are always exceptions to the rule. In sync with today's world of "faster is better," the people who wrote EPROM programmer software were looking for faster ways to program an EPROM, each cell of which has to be programmed separately. Each EPROM cell takes a small fraction of a second to program, which does not seem like a very long time; but with EPROMs getting bigger and bigger, those "fractions" add up, and it takes longer and longer to program them.

The software experts thought of one way to shorten the programming time: Since an EPROM contains all $FFs when it is new and just after it is erased, why not use that fact when programming? So, when the software is programming an EPROM, it first checks to see if the present data byte to be programmed is $FF. If it is, the software doesn't bother to program that byte, as it is already an $FF on the EPROM. Instead, it goes on to the next byte. The more $FFs there are in the data to be programmed, the faster it goes. Makes sense, doesn't it? Right! To further aggravate the problem, some EPROM programmers check for $FFs and won't even start if your EPROM isn't right.

Now, that is a problem. You can't erase the EPROM emulator with an eraser, and you can't program $FFs into it. You can't even unplug the battery to let the memory "forget"; that would make the EPROM emulator all zeros. What are you to do? Well, here is the answer. Build an Electronic EPROM Emulator Eraser. Wow, what a mouthful! But it will solve your problem.

Building It

To start with, you will need the standard tools you usually use on a project: soldering iron, solder, cutters, screwdrivers and the like. The parts list shows you what you will need. Some of these parts are not available at your local Radio Shack store, but they should all be available at a good electronics store.

Note that this project does not have to be plugged into a CoCo to work, and is completely self-contained. However, it does need a 5-volt supply. If you build it on a CoCo-compatible proto-board, you can get 5 volts from the CoCo's power supply. The 5-volt supply is available on Pin 9, and ground is on Pin 33.

First, let's start off with some theory. The EPROM emulator is mainly a RAM chip, so let's review our knowledge of RAM chips. Basically, this RAM chip has 13 address lines (A0 to A12), eight data lines (D0 to D7), one read/write line and some ChipEnable lines. Since this chip is emulating an EPROM, all lines are about the same except for the read/write line. It changes to the program (PGM) line. What we have to do is program the chip for $FFs, so all `DATA` lines are tied to Vcc, which is 5 volts and logical 1, using the PGM pin (See Figure 1) to strobe this data (always $FF) to the chip.

Every memory location has to be programmed this way. The easiest way to access every location is to do them in sequence, one at a time. For that you need some binary counters. Two of them will have enough bits to cover all addresses. In fact, if you study Figure 1, you will see the counters I am using are 74LS393. Each of these packages have two 4-bit counters. I am using two chips to give us a total of 16 bits. That is more than enough for us to use.

Setting up these counters is quite easy. The last bit of the first counter, QD (most significant bit), connects to the clock of the next, and this is repeated two more times to include all counters. The clock to the counter comes from a free-running clock. The LM555 is a versatile timer that can be used as a "one shot" or resettable timer, but I am using it as a free-running timer. That means that the output clocks high and low continuously, which is necessary in our case.

So, the output of the 555 is connected to the clock of the first counter. The clear (CLR) of the counters and the reset (R) of the 555 are connected together to an RC constant, which is just a capacitor that charges through a resistor. When you first turn the power on, the cap is discharged. Therefore, the

---

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.

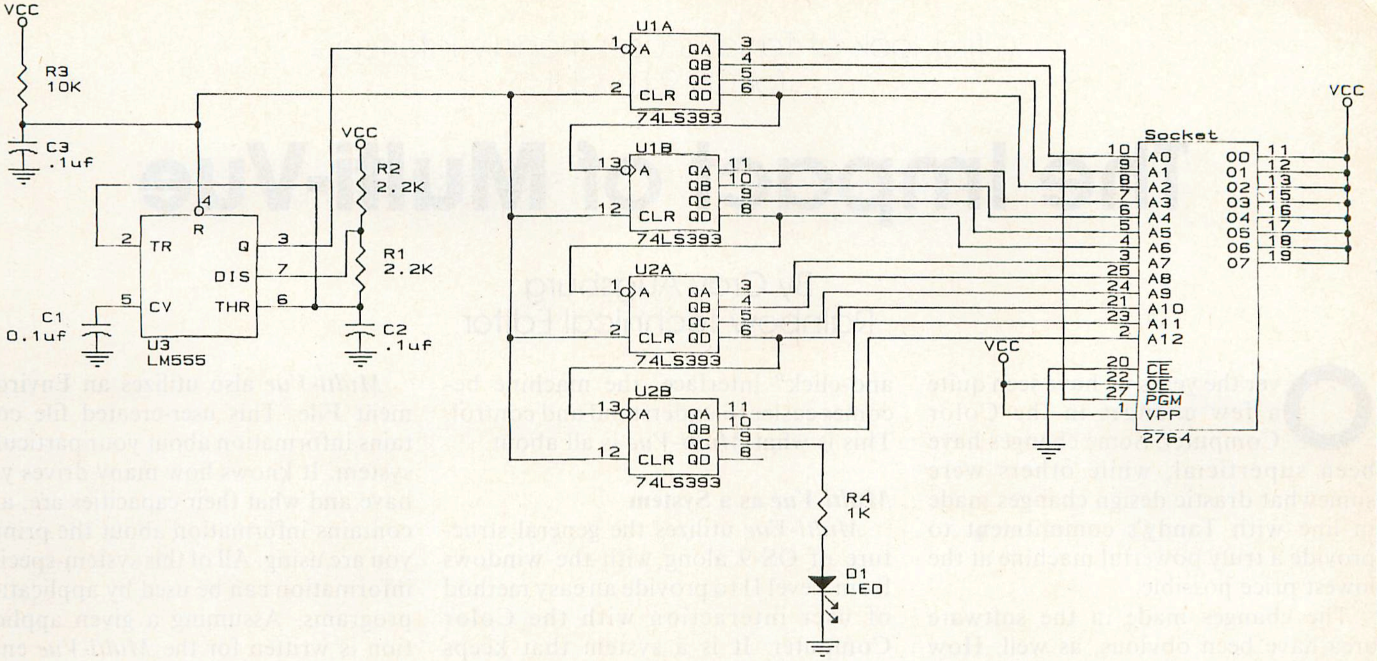

Figure 1

555 and the counter are held inactive. When the cap charges to 5 volts, it activates the 555 and counters. This is done in order to give the power supply time to stabilize and to make sure that all the chips are properly powered before starting. It also clears all the counters to zeros.

Once the power is stabilized and the reset releases, the 555 starts to clock. That starts the counters. If you notice, the first bit is connected to the PGM pin of our 2764 socket. That programs (or pulses) the data ($FF) into each chip. The next 13 bits of the counter are connected to address lines. It should be clear to you by now that all address lines have to be used.

The next bit on our counters is connected to an LED and a resistor. Last month I covered the theory on LEDs, so everyone should be up on it. This LED is used as an indicator to tell you that the process is finished. If you let the process continue, the LED will go off again and then on again. This will not hurt the chip, but it is not necessary to do it twice — once is enough.

Constructing the project is not too hard. It is recommended that you use sockets for all the chips. Use a 28-pin, ZIF socket for the 2764. If your budget does not allow for one, use a good quality socket, at least. Some of the cheap sockets are good only for one or two insertions. Figure 1 shows all connections except power and ground. The following is a power and ground connection list for this project:

Chip Number	Power (5v)	Ground
U1	14	7
U2	14	7
U3	8	1
2764	28	14

It would be a good idea to run a few tests before you plug the EPROM emulator into the eraser. Turn the power on and check with a digital probe or meter to see if the 555 is working and if all the address lines are clocking. You should also see if the LED lights up after a while. Check for the proper 5 volts and ground on the 2764 socket. That should be all there is to it.

Erasing an EPROM emulator is simple. With the power to the eraser turned off, insert the EPROM emulator. Turn the power on until you see the LED go on. Then turn the power off and remove the EPROM emulator. And that's that. □

Part	Description
U1	74LS 293
U2	74LS 293
U3	LM 555
C1	.1uf 25 V
C2	.1uf 25 V
C3	.1uf 25 V
R1	2.2K ¼ W
R2	2.2K ¼ W
R3	10K ¼ W
R4	1K ¼ W
D1	Red LED

Parts List

One-Liner Contest Winner . . .

If there is not a mouse in your house, do not despair! "Micki the Quicki Mouse" is here to fill the void.

The listing:

```
70 PMODE4:PCLS:SCREEN1,1:FORX=1T
030:CIRCLE(128,70),3*X/4:CIRCLE(
107,41),3*X/6:CIRCLE(148,40),3*X
/6:CIRCLE(128,130),5*X/4:NEXT:DR
AW"BM154,70R20":DRAW"BM154,80R16
":DRAW"BM104,80L16":DRAW"BM104,7
0L20":DRAW"BM160,149R6U6R8U8R10U
10R10U20":LINE INPUT
```

Ronald E. McClintock, Falls Church, VA

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

A first look at Tandy's user-friendly interface for OS-9 Level II

The Impact of Multi-Vue

By Cray Augsburg
Rainbow Technical Editor

Over the years we have seen quite a few changes in the Color Computer. Some changes have been superficial, while others were somewhat drastic design changes made in line with Tandy's commitment to provide a truly powerful machine at the lowest price possible.

The changes made in the software area have been obvious, as well. How many can remember not having Extended BASIC? What about Disk BASIC? Then, to top things off, Tandy licensed OS-9 Level I from Microware. Now, with the advent of the CoCo 3, we have OS-9 Level II. This operating system, complete with windows, has brought a power to the CoCo that few of us could have foreseen.

The problem with such power is that it often involves a great deal of complexity. Let's face it, OS-9 is no breeze to learn and understand! For some time now, we have needed a way to organize all of that power in order to utilize it to its fullest. The latest entry in the progression toward a powerful but easy-to-use system, *Multi-Vue*, provides us with that organizational ability.

Multi-Vue is an environment within an environment. Most people refer to programs of its nature as a "user interface," which is simply the method we use to interact with the computer. We have gone from toggle switches to keyboards, from joysticks to mice. But the computer presents information to us in much the same way it has throughout the personal computing era — via a video display. However, the format in which the data is displayed has changed. With pull-down menus and a "point-and-click" interface, the machine becomes easier to understand and control. This is what *Multi-Vue* is all about.

Multi-Vue as a System

Multi-Vue utilizes the general structure of OS-9 along with the windows from Level II to provide an easy method of user interaction with the Color Computer. It is a system that keeps track of where you are and allows for a sensible organization of the data you want to use. And, by its design, it allows the user to alter or customize the system to suit his or her particular needs. Mark Siegel, Tandy product manager for Software Engineering, says, "*Multi-Vue* will let the user build his own custom *DeskMate* out of stand-alone applications."

Multi-Vue doesn't include a word processor or a spreadsheet, or anything else we consider an application. Rather, it provides an environment for us to easily set up and operate the applications we choose to purchase.

It accomplishes its chores through a series of system files. As you probably have surmised, each application is associated with its own icon on the screen. When you select a particular icon, *Multi-Vue* doesn't directly run the application. Instead, it checks what is called an Application Information File (AIF). This system file contains information about which program it is to run, what parameters to use, which palettes to use, what minimum size window the application will run in and some other control information. *Multi-Vue* then executes the requested application based on this AIF file. Each application is associated with its own icon and AIF file.

The user simply creates an AIF file and icon for any application he or she wants to introduce into the system. Also, the AIF file for any application can easily be edited. Simply double-click the mouse button on the appropriate icon.

Multi-Vue also utilizes an Environment File. This user-created file contains information about your particular system. It knows how many drives you have and what their capacities are, and contains information about the printer you are using. All of this system-specific information can be used by application programs. Assuming a given application is written for the *Multi-Vue* environment, it can query the Environment File all by itself and configure itself for your particular system.

Many new users have a hard time moving through OS-9's directory structure and understanding just how, why and when to use the `chx` and `chd` commands. *Multi-Vue* eliminates this by offering a point-and-click alternative. When you boot the system, you'll notice that the screen contains icons for the various files and directories within the root directory.

To move into a given directory, just click on its associated icon. Then the screen will show the icons for all files and subdirectories within your current directory. In this manner, you can move down the "tree" as far as you need to go. Simply click on a small box in the upper left-hand corner of the screen and you will move one "place" backward.

When I say, "you will move one place backward," I mean you will return to the point from which you entered your current position. If you are within an application, it closes and you will find yourself back on the graphics screen pointing to the icon for that application. If you are not within an application or command, clicking the box takes you one level higher in the directory structure. This makes movement through the system much easier for newcomers.

Originally, it was rumored that *Multi-Vue* would not be able to run on a 128K system. This is not the case. However, since *Multi-Vue* runs in a graphics shell (a shell running in a graphics window), the memory restrictions of a 128K system do impose on the

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

performance of the environment. For instance, whenever the user chooses to do anything, the function he or she selects replaces the graphics shell in memory. The user cannot press the CLEAR key to return to the graphics shell; the graphics window and shell "come back to life" as soon as the user closes the application.

Performance on a 512K system is much more appreciable. The user simply clicks on the appropriate icon and a box appears in the current window. This box will be the same size as the minimum window size dictated by the AIF file. To set the box at a particular location, simply click the button again. The user can move the mouse (or joystick) to enlarge the box if desired. When the user clicks the button again, the system builds the application in this box (window) and starts it according to the information contained in the AIF file. This allows for a very smooth-running, user-friendly environment.

In its standard configuration, *Multi-Vue* seemed fairly fast. It is easy to imagine the power of this system running at 6ms on 80-track drives. Or, better yet, how about running it on a hard drive? The power of the environment would be enhanced that much more due to the storage capacity and speed allowed by such setups.

Additional Features

Across the top of the *Multi-Vue* "home screen" are several pull-down menus. These menus offer selections that allow you to control the system setup. One selection allows you to switch between the 40- and 80-column modes (512K system only). Another lets you add temporary devices to the environment. Let's say you have a RAM disk partitioned in memory and want to be able to access it. All you have to do is tell *Multi-Vue* that it exists. When you do, another device image appears on the left side of the screen with all the preconfigured device images.

One of the more esoteric, but very useful, features of the *Multi-Vue* environment is the Tandy icon. In the upper-left portion of the screen you will see a Tandy icon (an object shaped like an hourglass). This icon controls a menu that offers several goodies, including a pop-up calculator, a clock complete with alarm, system utilities and a clipboard function. The clipboard function can be used with properly written applications to "import" and "export" text — you can transfer sections of text between documents.

The utilities include a port option and printer configuration section. The printer section is fairly self-explanatory. The port option "replaces" the `Xmode` and `Tmode` commands used in OS-9. This selection allows you to change the various settings used for the serial port and the terminal.

A final option from the Tandy menu is the shell selection. After making this selection, you find yourself in a new bordered window from which you may execute various OS-9 system commands. Simply press the CTRL-BREAK combination to exit the shell and return to *Multi-Vue*.

What does all this mean? Tandy has made a "standard" out of OS-9 in the CoCo Community by moving to full support of it. Now they have introduced a standard-setting environment for OS-9 Level II on the CoCo 3. In other words, we should see *Multi-Vue* become a common point between applications written by the users, Tandy and third-party software houses. These applications would be written first to take advantage of the flexibility of the environment. They would be allowed to "interrogate" the system by reading the Environment File and then know how to configure themselves. Some programmers may include AIF files for their applications, eliminating the need for the end user to create such a file.

We will also see third-party applications taking advantage of the pop-up features such as the calendar and calculator. Also, the ability to import and export text will be utilized. Finally, we may see commercial software that includes "install" programs. The programs will automatically build the AIF file, read the Environment File, configure the application accordingly and install it on the system disk.

The most important aspect of the introduction of *Multi-Vue* is that OS-9 now has a very user-friendly interface. OS-9 novices will be able to run OS-9 without having to face the system itself. This may lead to a better understanding of the system in the long run because they will have a better feel for the environment before having to delve into the "how." Also, those who are already comfortable with OS-9 will find *Multi-Vue* makes their work that much easier and more enjoyable.

We are certainly excited about *Multi-Vue* and feel you will be, too. It opens up possibilities many people never thought of and will fill a strong need within the CoCo OS-9 Community.

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Five nifty utilities for programmers

Hackers Haven

Auto-Executing ML Programs

By Doug Masten

16K
Disk

If you have been using packaged, commercial software, you have probably noticed that some auto-execute without your having to enter `EXEC`. This feature helps make the program look more professional and also adds a small measure of copy protection.

My BASIC utility, *AutoExec* (shown in Listing 1), will add a boot program to the end of your ML program. Once you have installed the boot loader to your program, all you have to do is enter `LOADM"`*filename*`"` and it automatically executes for you. To install the auto-boot feature, just run `AUTOEXEC` and enter the full filename of the ML file you want to modify. Make sure a disk with that file is in Drive 0.

I advise you to always use a backup copy of your program when running this utility. *AutoExec* will work for most ML programs, but there will be some that won't work properly.

(Questions or comments about this program may be directed to the author at Route 4, Box 3, Macon, MO 63552. Please enclose an SASE when writing for a reply.)

Peeling Graphics

By Donald Sapello

32K ECB
EDTASM+

For a really wacky effect on your `PMODE 4,1` graphics, run the machine language program shown in Listing 2. *PeelPCLS* actually "peels" pictures from the screen. Try it on the test program *Sample* (Listing 3). To run the program, enter `LOADM"PEELPCLS"` and load or type in a BASIC program (`SAMPLE` or any other `PMODE` 4 graphic). Type `PCLEAR 8` and press `ENTER`. Then enter `EXEC` to peel the picture.

Painless Revisions

By Richard Steinbrueck

16K ECB

You are in the middle of a programming spree, have changed a few lines of a program and want to save the new version, but you don't want to erase the last version. So you rename the program and save it. Hours later, you have killed a few versions, renamed some others and now have a dozen revisions, each with a slightly different name. Several days later, you return to your programming to find you can't figure out which version is the most recent.

If that scenario sounds familiar, *Save and Run* can help you get organized and eliminate those problems. *Save and Run* is a 10-line routine that can be placed at the very beginning of a program, so that every time the program is run, the programmer is given the chance to save the program in its latest form with the extension indicating the version. The program matches the filename and extension as found in the disk directory with the name found in Line 0 of your program.

For your first copy, type in Listing 4, `SAVE&RUN.001`, and save it to disk in ASCII by entering `SAVE"SAVE&RUN.001",A`. Then run the program four times (one time for each of its four menu options) to test for possible errors.

When you want to do some programming of your own, load `SAVE&RUN.001` and modify Line 0 by replacing `SAVE&RUN.001` with the filename and extension you have chosen for your new program. Note: The filename replacing `SAVE&RUN` must have exactly eight characters or the program will not run properly because the peek and poke addresses are set for an eight-character filename. You can make any other modifications without affecting the peeks and pokes as long as you make them after the remark apostrophe in Line 0. Another caution: Because of the `GOTO10` statement in Line 3, your program must have a Line 10 or you will get a ?UL Error in 10.

Each time you want to save your work, just run your program. The directory will be listed, as well as the number of free granules. You will be given the following menu:

```
<C>ONTINUE OR SAVE
<S>AME
<N>EXT
<V>ERSION ###?
```

C runs the program without saving it. S saves the program with the same extension as is in Line 0. N increases the extension ASCII value by 1 and saves the program. V gives you the chance to enter any three-character extension. It must be three characters long, but can be numbers, letters, or both. I recommend using numbers so that you don't end up with some unacceptable characters (like the slash or period) when using the Next option.

I have `SAVE&RUN.001` on disk in ASCII without Line 10. Whenever I have a program I may want to work on, I make sure its first line number is 10. Then I type `MERGE"SAVE&RUN.001"` and make all my changes. When finished with all my editing, I type `DEL-9` to remove the `SAVE&RUN` routine.

Sometimes it is helpful to save your programming in ASCII so that you can use a word processor for major editing. `SAVE&RUN` can easily be modified to make ASCII saves by adding `,A"` to Line 9 so it reads `"SAVE F$,A"`. Unfortunately, an ASCII save will cause the program to stop after saving the program. To test run the program either type `RUN10` to skip over the `SAVE&RUN` routine or run and use the Continue option the second time.

Cassette users take heart. With two changes, `SAVE&RUN` will work for cassette, too. From Line 1 delete `CLS:DIR:PRINTFREE(0);"FREE GRANS:"` and in Line 9 change `SAVE` to `CSAVE`. After you make these changes, enter `CSAVE"SAVE&RUN.001",A`.

(Questions or comments regarding this program may be directed to the author at 1109 Lakemont Drive, Valrico, FL 33594. Please enclose an SASE when writing for a reply.)

Debugging with Wordfind

16K ECB
EDTASM+

By Donald Sapello

Have you ever tried to translate a program from one CoCo to another? If you have, you know how tedious it is to track down all occurrences of specific pokes and commands that would prevent the program's operation on the other machine. The program shown in Listing 7 can help.

Word Find is a machine language program that searches for any word or string of characters that is printed to the screen. To use the program, enter LOADM"WORDFIND" and then EXEC. Next, enter the word or string you want to find, then run or list a BASIC program; your program or listing will stop when the word is printed. Press any other key to continue, except BREAK or ENTER.

Putting On the Program Squeeze

16K
ECB

By Jyri J. Virkki

Do you need more space for your data, but your program takes almost all the available memory? Do you have programs that are just a little too large to fit on your system? Or maybe you like developing programs with lots of spaces so debugging is easier, but you feel bad about all the wasted memory? Or you hate to compromise either speed or beauty, writing code that is efficient but not so pretty or beautiful but memory-hungry?

You now can have the best of both worlds — write pretty code, debug it, and remove all unnecessary spaces from it when you are done — ending up with a very efficient running version.

Crush is a machine language utility that strips unneeded spaces from BASIC programs, without affecting spaces between quotation marks or after REMs.

Enter Listing 5 into your assembler and assemble it to produce CRUSH.BIN. Then you can just enter LOADM and EXEC. If you don't have an assembler, use Listing 6, which is a BASIC loader that will poke in the ML code.

Crush will run in any size system without trouble. The only incompatibility that might arise is the use of a Color BASIC subroutine located in $BDCC. This subroutine displays to the screen in decimal the number in Register D. You should enter EXEC &HBDCC to see if it works on your ROM (mine is 1.1). If the screen displays a zero then it does work on your ROM. If the result is different, you will have to make the following changes: in the assembly listing, delete lines 860 to 900; in the BASIC loader, replace Line 30 with 30 DATA 18,18,18; then change the 19378 in Line 60 to 18850.

If you use the BASIC loader, it will ask you for a starting address. Press ENTER without entering any number if you want to use the default address, which is $1DA. This is the location of the cassette I/O buffer, a very convenient place for short utilities since you can just type LOADM and EXEC without having to use CLEAR to reserve memory. The disadvantage of this is that you can't use cassette I/O. If you use disk exclusively, you can leave it there, but if you need to use your cassette, answer the prompt with another address to locate the program.

Each time the program removes a space it prints the line number from which it was removed (unless you had to remove the jump to $BDCC) — this is mainly to keep you entertained, allowing you to watch something other than a blank screen while the program crunches away. It may take quite a while to crush a long program with many spaces in it.

The reason *Crush* is slow is that each time it finds a space, it moves the rest of the program and pointers down by one byte, and then goes back to the beginning of the program and starts from there.

(Questions or comments may be directed to the author at Estacion Experimental, Rio Piedras, Puerto Rico 00928. Please enclose an SASE when writing for a reply.) □

Listing 1: AUTOEXEC

```
10 '**AUTOEXEC**
20 'ADDS BOOT LOADER TO
30 'END OF ML FILE
40 '
50 'BY DOUG MASTEN
60 '   ROUTE 4, BOX 3
70 '   MACON, MO 63552
80 DATA 0,0,3,1,&H82,&H7E
90 INPUT"FILENAME";F$
100 OPEN"D",#1,F$,1
110 FIELD #1,1 AS C$
120 R=1
130 GET#1,R
140 'TEST FOR EOF
150 IF ASC(C$)=&HFF THEN240
160 'GET LENGTH OF DATA BLOCK
170 GET#1,R+1
180 L=256*ASC(C$)
190 GET#1,R+2
200 L=L+ASC(C$)
210 R=R+L+5
220 GOTO130
230 'GET EXEC ADDRESS
240 GET#1,R+3
250 E1$=C$
260 GET#1,R+4
270 E2$=C$
280 'ADD BOOT LOADER TO ML FILE
290 RESTORE
300 P=0
310 READ C
320 LSET C$ = CHR$(C)
330 PUT#1,R+P
340 P=P+1
350 IF P<>6 THEN310
360 R=R+P
370 LSET C$=E1$
380 PUT#1,R
390 LSET C$=E2$
400 PUT#1,R+1
410 LSET C$=CHR$(&HFF)
420 PUT#1,R+2
430 LSET C$=CHR$(0)
440 PUT#1,R+3
450 LSET C$=CHR$(0)
460 PUT#1,R+4
470 LSET C$=E1$
480 PUT#1,R+5
490 LSET C$=E2$
500 PUT#1,R+6
510 CLOSE#1
520 PRINT
530 PRINT"BOOT PROGRAM INSTALLED
"
540 END
```

Still keeping the books the way Grandpa did?

Then you need CoCo-Accountant

Tired of scrounging through old shoeboxes full of receipts, canceled checks and bills? Looking for an easy way to organize your finances when the tax man calls? Then you need **CoCo-Accountant,** the best-selling home and small business accounting program for the Color Computer. All you have to do is set up a chart of accounts and begin entering transactions. Checks, credit card expenses, income. In any order. **Just toss it in and CoCo-Accountant sorts it out.** No fuss, no muss, no mess.

When you're through, Coco-Accountant will dazzle you with an array of reports that will answer the three basic questions we all ask about our finances: **Where did it come from? Where did it go? And what can I deduct from my taxes?**

Here's what it can do for you:

⇨ List and total expenses and income by **month.**

⇨ List and total expenses and income by **account,** for any month or the whole year.

⇨ List and total expenses or income by **payee or income source** for any month or the whole year.

⇨ Track, list and summarize **tax-deductible expenses.**

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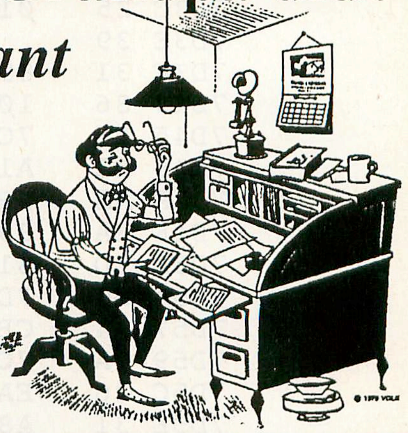
⇨ Produce **a printed spreadsheet** showing activity by month and account for the whole year!

⇨ **Balance your checkbook**, of course!

⇨ Sort entries by date and store files on tape or disk.

⇨ Up to 900 entries in a single file.

⇨ **Requires 64K CoCo or Coco 3.**



Coco-Accountant is $34.95 on tape or disk. Be sure to specify which you want when you order. We accept VISA and MasterCard. COD orders, add $3.00. Send check or money order to the address below or call our toll-free order line. For information, call 301-521-4886.

Federal Hill Software 8134 Scotts Level Rd. Baltimore, Md. 21208. Toll-free orders 800-628-2828 Ext. 850

Listing 2: PEELPCLS

```
                        00100 *************************
                        00110 *                       *
                        00120 *       PEELPCLS        *
                        00130 *          BY           *
                        00140 *    DONALD SAPELLO     *
                        00150 *                       *
                        00160 *************************
7D00                    00170             ORG      $7D00
7D00 DC   BC            00180 START       LDD      $BC
7D02 C3   3000          00190             ADDD     #$3000
7D05 1093 19            00200             CMPD     $19
7D08 22   34            00210             BHI      RTS
7D0A 9E   BC            00220 COPY        LDX      $BC
7D0C 31   89 1800       00230             LEAY     $1800,X
7D10 10BF 7D3A          00240             STY      CMPX+1
7D14 EC   81            00250 LOOP0       LDD      ,X++
7D16 ED   89 17FE       00260             STD      $17FE,X
7D1A BC   7D3A          00270             CMPX     CMPX+1
7D1D 25   F5            00280             BLO      LOOP0
7D1F 9E   BC            00290             LDX      $BC
7D21 BF   7CFD          00300             STX      $7CFD
7D24 BE   7CFD          00310 LINCLR      LDX      $7CFD
7D27 86   10            00320             LDA      #$10
7D29 B7   7CFF          00330             STA      $7CFF
7D2C CC   0000          00340             LDD      #$0
7D2F ED   81            00350 LLOOP0      STD      ,X++
7D31 7A   7CFF          00360             DEC      $7CFF
7D34 26   F9            00370             BNE      LLOOP0
7D36 BF   7CFD          00380             STX      $7CFD
7D39 8C   FFFF          00390 CMPX        CMPX     #$FFFF
7D3C 25   01            00400             BLO      LSKIP0
7D3E 39                 00410 RTS         RTS
7D3F 31   89 17E0       00420 LSKIP0      LEAY     $17E0,X
7D43 86   10            00430 GETPUT      LDA      #$10
7D45 B7   7CFF          00440             STA      $7CFF
7D48 EC   A1            00450 GLOOP0      LDD      ,Y++
7D4A AA   89 1800       00460             ORA      $1800,X
7D4E EA   89 1801       00470             ORB      $1801,X
7D52 ED   81            00480             STD      ,X++
7D54 BC   7D3A          00490             CMPX     CMPX+1
7D57 24   CB            00500             BHS      LINCLR
7D59 7A   7CFF          00510             DEC      $7CFF
7D5C 26   EA            00520             BNE      GLOOP0
7D5E 31   A8 C0         00530             LEAY     -$40,Y
7D61 10BC 7D3A          00540             CMPY     CMPX+1
7D65 24   DC            00550             BHS      GETPUT
7D67 20   BB            00560             BRA      LINCLR
          7D00          00570             END      START

00000 TOTAL ERRORS
```

Listing 3: SAMPLE

```
10 'SAMPLE PROGRAM FOR "PEELPCLS
"
20 PCLEAR 8
30 PMODE 4,1
40 PCLS
50 SCREEN1,1
60 FOR X = 1 TO 25
70 CIRCLE(RND(255),RND(191)),RND
(40)
80 NEXT X
90 EXEC
100 GOTO 60
```

Listing 4: SAVE&RUN

```
0 F$="SAVE&RUN.BAS" 'Copyright 1
986 by Richard Steinbrueck, All
Rights Reserved
1 CLS:DIR:PRINTFREE(0);"FREE GRA
NS":A=PEEK(25)*256+PEEK(26):B=PE
EK(A+17):C=PEEK(A+18):D=PEEK(A+1
9):PRINT"<C>ONTINUE OR SAVE <S>A
ME,<N>EXTOR <V>ERSION ###?"
2 A$=INKEY$:IFA$=""THEN2
3 E=INSTR("CSN",A$):ON E GOTO10,
8,5:IFA$<>"V"THEN2ELSEINPUT"WHAT
 VERSION (3 CHAR)";A$:IFLEN(A$)<
>3THEN1
4 B=ASC(LEFT$(A$,1)):C=ASC(MID$(
A$,2,1)):D=ASC(RIGHT$(A$,1)):GOT
O7
5 D=D+1:IF D=57 THEN C=C+1:D=48
6 IF C=57 THEN B=B+1:C=48
7 IF B=57 THEN B=48
8 POKE A+17,B:POKEA+18,C:POKEA+1
9,D
9 F$=LEFT$(F$,9)+CHR$(B)+CHR$(C)
+CHR$(D):SAVE F$:CLS
10 'there is a GOTO 10 in line 3
of the program.  Make sure you
have a line 10 in your program
to avoid getting an error
message  of ?UL ERROR IN 10
```

Listing 5: CRUSH

```
                00010 ***************************
                00020 *        CRUSH !          *
                00030 *      VERSION 2.1        *
                00040 *                         *
                00050 *       WRITTEN  BY       *
                00060 *     JYRI  J. VIRKKI     *
                00070 * ESTACION EXPERIMENTAL   *
                00080 * RIO PIEDRAS, PR 00928   *
                00120 ***************************
     01DA       00130          ORG      $1DA
```

Burke & Burke

P.O. Box 1283   Palatine, IL   60078-1283   (312) 397-2898

1988 -- The Year of the Hard Disk!

The CoCo XT hard disk interface from Burke & Burke lets you connect up to 2 low cost, PC compatible 5 - 120 Meg hard drives to your CoCo. You buy the Western Digital WD1002-WX1 or WD1002-27X (RLL) controller, a case and a drive from the PC dealer of your choice. Just plug them into the CoCo XT, and you have a 20 Meg OS9 hard disk system for under $450!

RAINBOW CERTIFICATION SEAL

CoCo XT (with anodized housing, 50 page user manual, hard disk back-up utility and drivers for both OS9 & HYPER-I/O) -- $69.95. **CoCo XT-RTC** (includes real-time clock / calendar with battery backup) -- $99.95

NEW!!! XT-ROM -- Installs in the ROM socket of your CoCo XT hard disk controller. Boots OS9 from your hard or floppy disk -- $19.95.

64K COCO OR COCO 3 & MULTI-PAK REQUIRED FOR ALL VERSIONS. HYPER-I/O REQUIRED FOR USE WITH RS-DOS.

Make Tracks . . .

Got the 35-track floppy disk blues? Burke & Burke's HYPER-I/O program modifies the RS-DOS BASIC in your CoCo 1, 2, or 3 to provide a "Dynamic Disk Interface" that works with the CoCo XT hard disk. It also lets you use any mix of single-sided and double-sided floppy disk drives in your system -- even those 720K floppies!

HYPER-I/O (64K, includes 50 page user manual and utilities) -- $24.95.
HYPER-III (RAM Disk and Print Spooler for CoCo 3 HYPER-I/O) --$19.95

Directory Assistants

Here are two real time savers for OS9 users. WILD lets you use wild cards with OS9's commands. MV rapidly moves files, and even entire directories, from place to place on your hard or floppy disks. **WILD & MV** -- one disk, two great utilities, only $19.95!

OS9: wild asm /d0/src/*.src o=/d1/abs/release/*.abs
OS9: mv /d1/abs/release /d1/release

MasterCard ILLINOIS RESIDENTS PLEASE ADD 7.0% SALES TAX. COD's add $2.00. Shipping (within the USA) $2.00 per CoCo XT; $1.50 per disk or ROM. Please allow 2 weeks for delivery (overnight delivery also available for in-stock items). Telephone orders accepted. VISA

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Phone credit given with orders.

(513) 233-2200

SOFT-BYTE
P.O. Box 5701, Forest Park
Dayton, Ohio 45405

MasterCard VISA

```
                      00140 **************************
01DA                  00150 COUNT     RMB     2
01DC                  00160 LINE      RMB     2
01DE                  00170 NEXT      RMB     2
01E0                  00180 STATUS    RMB     1
                      00190 **************************
01E1 86    01         00200 START     LDA     #1
01E3 A7    8C FA      00210           STA     STATUS,PCR
01E6 6F    8C F1      00220           CLR     COUNT,PCR
01E9 8D    14         00230 AGAIN     BSR     BEGIN
01EB 6D    8C F2      00240           TST     STATUS,PCR
01EE 26    F9         00250           BNE     AGAIN
01F0 DC    1F         00260           LDD     $1F
01F2 A3    8C E5      00270           SUBD    COUNT,PCR
01F5 DD    1F         00280           STD     $1F
01F7 DC    1D         00290           LDD     $1D
01F9 A3    8C DE      00300           SUBD    COUNT,PCR
01FC DD    1D         00310           STD     $1D
01FE 39               00320           RTS
                      00330 **************************
01FF 9E    19         00340 BEGIN     LDX     25
0201 AF    8C D8      00350           STX     LINE,PCR
                      00360 **************************
0204 AE    9C D5      00370 SEARCH    LDX     [LINE,PCR]
0207 8C    0000       00380           CMPX    #0
020A 27    20         00390           BEQ     ITSOVR
020C AF    8C CF      00400           STX     NEXT,PCR
020F AE    8C CA      00410           LDX     LINE,PCR
0212 30    04         00420           LEAX    4,X
0214 A6    80         00430 LOOPY     LDA     ,X+
0216 81    20         00440           CMPA    #32
0218 27    2A         00450           BEQ     CRUNCH
021A 81    22         00460           CMPA    #'"
021C 27    1A         00470           BEQ     SKIP
021E 81    83         00480           CMPA    #131
0220 27    0E         00490           BEQ     NOTHR
0222 81    82         00500           CMPA    #130
0224 27    0A         00510           BEQ     NOTHR
0226 81    00         00520           CMPA    #0
0228 27    06         00530           BEQ     NOTHR
022A 20    E8         00540           BRA     LOOPY
                      00550 **************************
                      00560 *  NO MORE SPACES LEFT   *
                      00570 **************************
022C 6F    8C B1      00580 ITSOVR    CLR     STATUS,PCR
022F 39               00590           RTS
                      00600 **************************
                      00610 *    GO TO NEXT LINE     *
                      00620 **************************
0230 AE    8C AB      00630 NOTHR     LDX     NEXT,PCR
0233 AF    8C A6      00640           STX     LINE,PCR
0236 20    CC         00650           BRA     SEARCH
                      00660 **************************
                      00670 *  DON'T REMOVE SPACES   *
                      00680 *BETWEEN QUOTATION MARKS*
                      00690 **************************
0238 A6    80         00700 SKIP      LDA     ,X+
023A 81    22         00710           CMPA    #'"
```

```
023C 27    D6        00720          BEQ    LOOPY
023E 81    00        00730          CMPA   #0
0240 27    EE        00740          BEQ    NOTHR
0242 20    F4        00750          BRA    SKIP
                     00760 **************************
                     00770 * MOVE PROGRAM DOWN BY   *
                     00780 * ONE BYTE.              *
                     00790 **************************
0244 1F    12        00800 CRUNCH   TFR    X,Y
0246 31    3F        00810          LEAY   -1,Y
0248 A6    80        00820 LOOPR    LDA    ,X+
024A A7    A0        00830          STA    ,Y+
024C 9C    1B        00840          CMPX   27
024E 25    F8        00850          BLO    LOOPR
0250 AE    8C 89     00860          LDX    LINE,PCR
0253 EC    02        00870          LDD    2,X
0255 BD    BDCC      00880          JSR    $BDCC
0258 86    20        00890          LDA    #32
025A AD    9F A002   00900          JSR    [$A002]
                     00910 **************************
                     00920 *MOVE NEXT LINE POINTERS*
                     00930 * DOWN BY ONE BYTE.      *
                     00940 **************************
025E AE    9D FF7A   00950 MORE     LDX    [LINE,PCR]
0262 8C    0000      00960          CMPX   #0
0265 27    0C        00970          BEQ    NOMORE
0267 30    1F        00980          LEAX   -1,X
```

Clearbrook Software Group **(604)853-9118**

CSG IMS

Information Management System

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CSG IMS is *THE* full featured relational database manager for the Color Computer and OS9. The comprehensive structured application language makes **CSG IMS** the ideal developement tool for sophisticated file-intensive applications.

- Interactive access to databases and quick queries.
- CSG IMS includes a recursive compiled language supporting program modules with full parameter passing.
- User defined screen and report formats.
- Record, index and file size almost unlimited.
- Text, BCD floating point (14 digits), short and long integer and date types.

CSG IMS for CoCo2/3 OS9 L1/2 (single user)$169.95
CSG IMS for OS9 L2 or 68000(multi user) $495.00
CSG IMS demo with manual $30

ERINA - Symbolic User Mode Debugger for OS9

ERINA is a must for all serious assembler and C software developers. It lets you find bugs quickly by displaying the machine state and instuctions being executed. You can set address and register break points, dump, search and change memory, assemble and disassemble code and many other things to numerous to mention. This program will pay for itself over and over by the time you save solving your bugs.

Requires 80 column display, OS9 L1/2 $69.00

SERINA - System Mode Debugger for OS9 L2

SERINA is a debugger for OS9 system modules (device drivers, file managers, etc.). It allows you to trace execution of any system module, set break points, assemble and disassemble code and examine and change memory. There are special provisions for executing code with critical timing loops and for accessing I/O registers. A must for system programmers.

Requires CoCo3, OS9 L2, $139.00
80 col. terminal connected to /T1 or /T2

MSF - MSDos File Manager for CoCo 3/OS9 Level 2

MSF is a file manager which allows you to use MSDos disks directly under OS9. You don't have to change the format of the data before using it!

Requires CoCo 3, OS9 L2, SDISK3 driver $45.00

Shipping: N. America - $5, Overseas - $10

Clearbrook Software Group
P.O. Box 8000-499
Sumas, WA 98295

VISA MasterCard

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```
0269 AF   9D FF6F   00990          STX      [LINE,PCR]
026D AF   8D FF6B   01000          STX      LINE,PCR
0271 20   EB        01010          BRA      MORE
0273 9E   1B        01020 NOMORE   LDX      27
0275 30   1F        01030          LEAX     -1,X
0277 9F   1B        01040          STX      27
0279 AE   8D FF5D   01050          LDX      COUNT,PCR
027D 30   01        01060          LEAX     1,X
027F AF   8D FF57   01070          STX      COUNT,PCR
0283 39             01080          RTS
                    01090 *************************
          01E1      01100          END      START

00000 TOTAL ERRORS
```

Listing 6: LOADER

```
0 DATA0,0,0,0,0,0,0,134,1,167,14
0,250,111,140,241,141,20,109,140
,242,38,249,220,31,163,140,229,2
21,31,220,29,163,140,222,221,29,
57,158,25,175,140,216,174,156,21
3,140,0,0,39,32,175,140,207,174
10 DATA140,202,48,4,166,128,129,
32,39,42,129,34,39,26,129,131,39
,14,129,130,39,10,129,0,39,6,32,
232,111,140,177,57,174,140,171,1
75,140,166,32,204,166,128,129,34
,39,214,129,0,39,238,32,244,31,1
8
20 DATA49,63,166,128,167,160,156
,27,37,248,174,140,137,236,2
30 DATA189,189,204
48 DATA134,32,173,159,160,2,174,
157,255,122,140,0,0,39,12,48,31,
175,157,255,111,175,141,255,107,
32,235,158,27,48,31,159,27,174,1
41,255
50 DATA93,48,1,175,141,255,87,57
,0
52 CLS:PRINT"      BASIC LOADER F
OR CRUSH"
54 PRINT:PRINT:INPUT"STARTING AD
DRESS";SA:IFSA=0THENSA=474
56 EA=SA+170
58 FORR=SATOEA:READA:POKER,A:C=C
+A:NEXT
60 IFC<>19378THENPRINT"***   DAT
A ERROR   ***":STOP
62 SA=SA+7:POKE157,INT(SA/256):P
OKE158,SA-INT(SA/256)*256
64 PRINT:IFSA>3072THENPRINT"REME
MBER TO CLEAR500,"SA-8:PRINT"BEF
ORE LOADING CRUSH."
66 INPUT"SAVE TO <T>APE OR <D>IS
K";A$:IFA$<>"T"ANDA$<>"D"THEN66
68 IFA$="T"THENCSAVEM"CRUSH",SA-
7,EA,SA:END
70 SAVEM"CRUSH",SA-7,EA,SA
```

Listing 7: WORDFIND

```
                    00100 *************************
                    00110 *                       *
                    00120 *       WORDFIND        *
                    00130 *          BY           *
                    00140 *    DONALD SAPELLO     *
                    00150 *                       *
                    00160 *************************
                    00170 *    32K VERSION        *
                    00180 *    FOR 16K VERSION    *
                    00190 *    MEMTOP EQU $3FFF   *
                    00200 *************************
          7FFF      00210 MEMTOP   EQU      $7FFF
7E00                00220          ORG      MEMTOP-$1FF
7E00 CC   7E00      00230 START    LDD      #MEMTOP-$1FF
7E03 DD   74        00240          STD      $74
7E05 DD   27        00250          STD      $27
```

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(CoCo III only)

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(See July '87 review) Disk.................................... $16.95

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(See Aug. '87 review) Disk.................................. $14.95

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More resolution! / More power! / More color!
Built in animation! / More speed! / More tools!
More type styles! / Amazing color sequencing!!!
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(CoCo III only)

This hardware device protects your RGB or composite monitor, or your TV from IMAGE BURN after a few minutes of inactivity from your keyboard. Illustrated instructions and easy to install. Just................. $29.95
(See January '88 review)

FKEYS III

(CoCo I/II/III)

A user friendly, user programmable function key utility that creates up to 20 function keys. Other features include an EDITOR, DOS mods, and DISABLE. Comes with an enhanced CoCo III version and it's EPROMable.
(See April '87 review) Disk (latest version)...... $19.95

SIXDRIVE

(CoCo I/II/III)

This machine language utility modifies DECB 1.0, 1.1, FKEYS III, or ADOS to allow the use of 3 double-sided drives (or 2 D/S drives and **J&R's RAMDISKS**) as 6 single-sided drives without ANY hardware mods. Includes 2 selectable drive assignments and it's EPROMable.

Disk.. $16.95
With purchase of FKEYS III........................... $12.95
With purchase of any JramR.......................... $ 9.95

JramR 512K Upgrade

(CoCo III only)

#1010 JramR bare board, connectors, and software.. $39.95
#1014 JramR assembled and tested with software, without memory chips................................ $49.95
#1012 JramR assembled and tested with software, 512K memory.. $99.95
(See June '87 review)

<<< NEW >>>

MAXSOUND

Call for Demo

(128k or 512k CoCo III only)

Turn your CoCo III into a REAL digital audio sampler with HIGH quality audio reproduction. Exotic effects, stuttering, speed shifting, sequencing, reverse audio, plus free digital oscilloscope program! You have got to hear MAXSOUND to believe it!!! Disk & Hdwe............ $79.95

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(128k or 512k CoCo III only)

V-Term is one of the most advanced terminal programs for the CoCo III ever!!!

FEATURES: VT-100, VT-52, and standard CRT emulations. Full use of 512K, 80X25 text or graphics characters, Windows & Multi-tasking(Disk Basic!), RAMDISK like buffer, Xmodem, Xon/Xoff, Monochrome monitor support, Capture buffer, Snapshot, Conference mode, and much much more! Complete with documentation. Disk......................... $39.95

PYRAMIX

(CoCo III only)

This 100% machine language arcade game was written exclusively to take advantage of your CoCo 3. The colors are brilliant, the graphics are sharp, and the action is hot!
(See Dec. '87 review) Disk............................ $19.95

CHAMPION

(CoCo I/II/III)

Become a superhero in your fight to rid the world of the evil forces of Mr. Bigg in this action adventure. The combat is hot and heavy and requires a fast joystick!
(See May '87 review) Disk.............................. $19.95

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(CoCo I/II/III)

This is the long-awaited response to the huge demand for a Kung-Fu program for the CoCo. Destroy opponents and evade obstacles as you grow even closer to your ultimate objective! (See Feb. '88 review) Disk............... $24.95

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(CoCo I/II/III)

Enter the age of monsters, magic, and adventure. Here you will search for the legendary power of White Fire throughout the Forbidden Wood and dark caverns.
(See Dec. '86 review) Disk................................ $19.95

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```
7E07 CC   00C8     00260          LDD    #200
7E0A 35   10       00270          PULS   X
7E0C BF   7E13     00280          STX    LDX+1
7E0F BD   AE46     00290          JSR    $AE46
7E12 8E   FFFF     00300 LDX      LDX    #$FFFF
7E15 34   10       00310          PSHS   X
7E17 8E   7F07     00320          LDX    #DATA
7E1A 7F   7FFE     00330          CLR    MEMTOP-1
7E1D BD   7EA9     00340 LOOP1    JSR    LOOP5
7E20 7C   7FFE     00350          INC    MEMTOP-1
7E23 B6   0167     00360          LDA    $167
7E26 81   39       00370          CMPA   #$39
7E28 27   08       00380          BEQ    SKIP2
7E2A BE   0168     00390          LDX    $168
7E2D 8C   7E47     00400          CMPX   #MONITR
7E30 27   11       00410          BEQ    CLEAR1
7E32 BF   7E83     00420 SKIP2    STX    DB1
7E35 B7   7E82     00430          STA    RETURN
7E38 86   7E       00440          LDA    #$7E
7E3A 8E   7E47     00450          LDX    #MONITR
7E3D B7   0167     00460          STA    $167
7E40 BF   0168     00470          STX    $168
7E43 7F   7FFF     00480 CLEAR1   CLR    MEMTOP
7E46 39            00490          RTS
7E47 34   02       00500 MONITR   PSHS   A
7E49 96   6F       00510          LDA    $6F
7E4B B1   7FFF     00520          CMPA   MEMTOP
7E4E 35   02       00530          PULS   A
7E50 26   30       00540          BNE    RETURN
7E52 7D   7FFE     00550          TST    MEMTOP-1
7E55 27   2B       00560          BEQ    RETURN
7E57 34   36       00570          PSHS   A,B,X,Y
7E59 7D   7FFD     00580          TST    MEMTOP-2
7E5C 26   0D       00590          BNE    MLOOP1
7E5E 8E   7F07     00600          LDX    #DATA
7E61 6D   84       00610          TST    ,X
7E63 27   1B       00620          BEO    MRETRN
7E65 7C   7FFD     00630          INC    MEMTOP-2
7E68 BF   7E85     00640          STX    DB2
7E6B BE   7E85     00650 MLOOP1   LDX    DB2
7E6E A1   84       00660          CMPA   ,X
7E70 27   05       00670          BEQ    MSKIP1
7E72 7F   7FFD     00680          CLR    MEMTOP-2
7E75 20   09       00690          BRA    MRETRN
7E77 30   01       00700 MSKIP1   LEAX   1,X
7E79 BF   7E85     00710          STX    DB2
7E7C 6D   84       00720          TST    ,X
7E7E 27   07       00730          BEQ    INKEY
7E80 35   36       00740 MRETRN   PULS   A,B,X,Y
7E82 39            00750 RETURN   RTS
7E83               00760 DB1      RMB    2
7E85               00770 DB2      RMB    2
7E87 7F   7FFD     00780 INKEY    CLR    MEMTOP-2
7E8A 7F   7FFE     00790          CLR    MEMTOP-1
7E8D 6F   E4       00800          CLR    ,S
7E8F AD   9F A002  00810          JSR    [$A002]
7E93 7C   7FFE     00820          INC    MEMTOP-1
7E96 AD   9F A000  00830 ILOOP    JSR    [$A000]
```

Computer Island Educational Software

ARROW GAMES

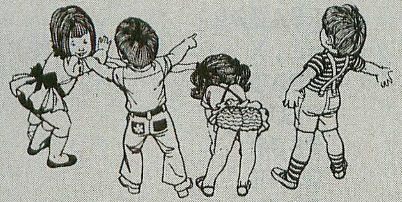
32K Ext. - $21.95 tape/$26.95 disk

Six menu driven games for young children (ages 3-6) to teach directions. All games involve using the arrow keys ONLY. Games include: LADYBUG, BUTTERFLY, ARROW MATCH, KALEIDOSCOPE, RABBIT, and DOODLE. Colorful graphics.

FIRST GAMES

32K Ext. - $24.95 tape/$29.95 disk

First Games contains 6 menu driven programs to delight and teach your early learners (ages 3-6). These games enrich the learning of colors, numbers, lower case letters, shapes, memory, visual discrimination and counting.



CLOZE STORIES

32K Ext. - $19.95 Tape/$24.95 Disk

These programs give students practice using the popular CLOZE reading technique. Each program contains grade appropriate short stories with key missing words to be deduced by the student. Available for grades 3, 4, 5, 6, OR 7. Please specify.

DRAWING CONCLUSIONS

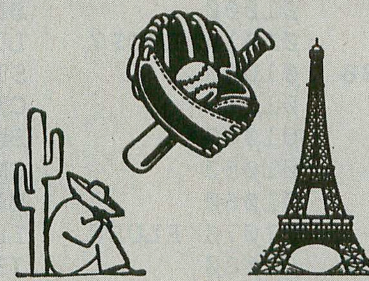
32K Ext. - tape $19.95/disk $24.95

These programs contain short stories. Each story has two accompanying questions that ask the student to draw conclusions from the text. Available for grades 3-4 OR 5-6. Please specify.

LOCATING STORY DETAILS

32K Ext. - disk only - $24.95

These programs contain short stories. Each has an accompanying picture. Questions about story details refer to either the text or pictures. The disk generated graphics are an integral part of these attractive programs. Available for grades 2-3 OR 4-5. Please specify.

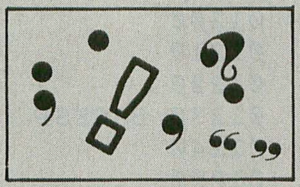


FOREIGN LANGUAGE GAMES

32K Ext. - $19.95 tape/$24.95 disk (500 words)

French or Spanish Baseball

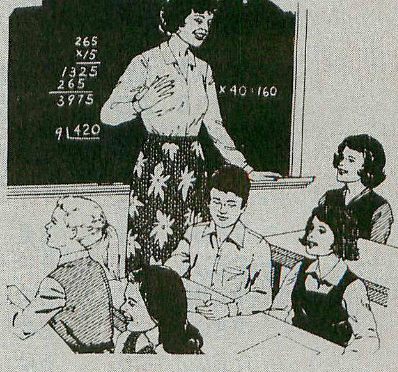
Score base hits or home runs for correct answers. You're out if wrong. Correct answers supplied. Fun way to learn and practice vocabulary. PLEASE SPECIFY LANGUAGE.



PUNCTUATION PRACTICE

32K Ext. - tape $19.95/disk $24.95

On screen practice in proper usage of the familiar punctuation marks. Grades 3-7.



MATH TUTOR SERIES

16K Ext.

These tutorials take the child through each step of the example. All programs include HELP tables, cursor and graphic aids. All allow user to create the example, or let the computer choose. Multi-level. Great teaching programs.

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$14.95 tape/$19.95 disk

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FRACTIONS TUTOR (addition)
$19.95 tape/$24.95 disk

FRACTIONS TUTOR (subtraction)
$19.95 tape/$24.95 disk

FRACTIONS TUTOR (mult.)
$19.95 tape/$24.95 disk

COMPUTER LITERACY

32K Ext. - $19.95 tape/$29.95 disk

A computer literacy quiz exclusively for the Color Computer. Tests and scores from over 60 questions on a Hi-res upper and lower case screen. Reviews computer literacy and beginning programming knowledge. Ages 10 and up.

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```
7E9A 27   FA         00840        BEQ    ILOOP
7E9C 81   0D         00850        CMPA   #$0D
7E9E 27   04         00860        BEQ    CANCEL
7EA0 81   03         00870        CMPA   #$03
7EA2 26   DC         00880        BNE    MRETRN
7EA4 7F   7FFE       00890 CANCEL CLR    MEMTOP-1
7EA7 20   D7         00900        BRA    MRETRN
7EA9 34   14         00910 LOOP5  PSHS   X,B
7EAB 8E   7F07       00920        LDX    #DATA
7EAE AD   9F A000    00930 LOOP6  JSR    [$A000]
7EB2 26   0E         00940        BNE    LOOP7
7EB4 B6   0113       00950        LDA    $113
7EB7 48              00960        LSLA
7EB8 84   20         00970        ANDA   #$20
7EBA 8A   8F         00980        ORA    #$8F
7EBC A7   9F 0088    00990        STA    [$88]
7EC0 20   EC         01000        BRA    LOOP6
7EC2 C6   60         01010 LOOP7  LDB    #$60
7EC4 E7   9F 0088    01020        STB    [$88]
7EC8 81   15         01030        CMPA   #$15
7ECA 26   12         01040        BNE    SKIP
7ECC 8C   7F07       01050        CMPX   #DATA
7ECF 27   0D         01060        BEQ    SKIP
7ED1 86   08         01070 FLUSH  LDA    #$8
7ED3 AD   9F A002    01080        JSR    [$A002]
7ED7 30   1F         01090        LEAX   -1,X
7ED9 8C   7F07       01100        CMPX   #DATA
7EDC 26   F3         01110        BNE    FLUSH
7EDE 81   0D         01120 SKIP   CMPA   #$0D
7EE0 27   20         01130        BEQ    DONE
7EE2 81   08         01140        CMPA   #$08
7EE4 27   0F         01150        BEQ    BACKSP
7EE6 81   03         01160        CMPA   #$03
7EE8 27   C4         01170        BEQ    LOOP6
7EEA A7   80         01180        STA    ,X+
7EEC 8C   7FFB       01190        CMPX   #MEMTOP-4
7EEF 23   0B         01200        BLS    CHROUT
7EF1 30   1F         01210        LEAX   -1,X
7EF3 20   B9         01220        BRA    LOOP6
7EF5 8C   7F07       01230 BACKSP CMPX   #DATA
7EF8 27   B4         01240        BEQ    LOOP6
7EFA 30   1F         01250        LEAX   -1,X
7EFC AD   9F A002    01260 CHROUT JSR    [$A002]
7F00 20   AC         01270        BRA    LOOP6
7F02 6F   84         01280 DONE   CLR    ,X
7F04 35   14         01290        PULS   B,X
7F06 39              01300        RTS
7F07      00         01310 DATA   FCB    0
          7E00       01320        END    START

00000 TOTAL ERRORS
```

Telewriter-128™

the Color Computer 3 Word Processor

For over 5 years now, Telewriter has been the #1 Color Computer word processor, both in popularity and in performance. Telewriter's near perfect mix of sophisticated professional features and a very natural user interface, has earned it the highest praise in numerous magazines, and an intensely loyal following among tens of thousands of Color Computer users all over the world.

HISTORY

Throughout the history of the Color Computer, Telewriter has pioneered software breakthroughs that set the standards.

In 1981, it was Telewriter 1.0 that first took the Color Computer's inadequate 32X16 all-uppercase display, and replaced it with a graphics-based 51X24 upper and lowercase display.

A few years later, Telewriter-64 added high density 64X24 and 85X24 displays and access to the full 64K of the newer Color Computers.

THE NEW AGE

Today, Telewriter-64 is recognized as the standard Color Computer word processor. It runs on all Tandy Color Computers — from the original Color Computer 1, to the Color Computer 2, and 3.

But the Color Computer 3 brings a whole new level of power to low cost computing and, so, a new Telewriter is here to put that power to work for you. We call it Telewriter-128.

TELEWRITER-128

You don't mess with a good thing, so Telewriter-128 is still Telewriter-64 at heart. The commands, and the user interface are essentially the same. If you know Telewriter-64, then you already know Telewriter-128. And, if you don't know Telewriter-64, you'll still have an easy time learning and using Telewriter-128.

80 COLUMNS

But there are major differences as well. First, Telewriter-128 uses the Color Computer 3's new 80 column screen display.

This means, simply, that using Telewriter-128 on a low cost Color Computer 3 will look a lot like using a more expensive word processor on a much more expensive IBM PC, PS/2, or clone.

SPEED

Second, Telewriter-128 is lightning fast. Telewriter-64 was fast in its own right, but, by accessing the Color Computer 3's video hardware directly, and by running the machine in double speed mode, Telewriter-128 is able to provide extremely fast scrolling and instant paging — functions whose speed is crucial to serious word processing.

In this department, Telewriter-128 doesn't simply keep up with IBM-based word processors — it generally surpasses them!

EASE

Third, Telewriter-128 adds a host of new features big and small, that make it even easier to use.

Features like: Quick function key access to the editor or the menus — an instant on-line help screen summarizing all Telewriter commands and special characters — an option file where you store your personal set of format and screen settings so you only have to set them once!

Then, there's a quick save feature which allows you to save all your current work without leaving the editor. There's a simple way to cursor through the disk directory and read in a file by just hitting ENTER. And there's more.

NEW POWER

Telewriter-64 always had the power to handle any kind of serious writing, from letters to textbooks. But, here too, Telewriter-128 adds major features.

Like Macros — which let you insert whole words or phrases (even sets of control codes or format commands) into your text, with a single keypress. And every time you power up Telewriter-128, the macro definitions are automatically loaded*, so they're always there.

Then there's a Print Preview feature that shows you, on-screen, the way your printed text will look — with margins, headers, centering, justification, page numbering, and page breaks. This guarantees letter perfect documents every time, and makes tasks like widow/orphan line elimination, a breeze.

TELEWRITER-64 OR TELEWRITER-128

We could go on listing features, but the point is this: If you own a Color Computer, you already have the hardware for the most powerful, low cost word processor in town. All you need now is to add the heart and soul:

Telewriter-64, for the Color Computer 1 and 2, costs $59.95 on disk, $49.95 on cassette.

Telewriter-128 for the Color Computer 3 costs $79.95 on disk, $69.95 on cassette.

To order by Mastercard or Visa call (619) 755-1258 anytime, or send check or money order plus $2 shipping (Californians add 6% sales tax) to:

COGNITEC
704 Nob Ave.
Del Mar, CA 92014

To upgrade from Telewriter-64 to Telewriter-128, return your original disk or cassette with $39.95. (Add $10 if you're also upgrading from cassette to disk. Deduct $10 with proof of Oct '87 - Feb '88, purchase of Telewriter-64.)

> *When I first got Telewriter-64 last year, I was in heaven. I couldn't believe the program's versatility and ease of use.*
> -The RAINBOW, Oct. 1985

TELEWRITER-64 FEATURES: Compatibility with any printer that works with the Color Computer; embedded control codes for underlining, boldface, sub/superscript, variable fonts; format commands for headers, centering, margin and spacing changes anywhere in the document; Format menu to set margins, spacing, page numbering, BAUD rate, lines per page, justification; Chain printing for one shot printing of multi-file documents. Fast, full-screen editor with wordwrap, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, text alignment, tabs, error protection, word and line counter. Insert or delete text anywhere on the screen. Simple, easy to remember commands. Optional ASCII files for compatibility with spell checkers, terminal programs, and BASIC. Load, save, append, partial save files to disk or cassette. Kill, rename and list disk files. Cassette verify and auto-retry on error.

TELEWRITER-128 - ADDITIONAL FEATURES: Print preview from editor; multiple copy print; footers; hanging indents; cursor thru disk directory to load, append, rename and kill files; quick file save from editor; keyclick; key repeat; true block move; 24, 25, or 28 line screen; 40 or 80 column screen; dual speed cursor; on-line help; overstrike mode; word delete; wordwrap at margin; user definable macros; nested macros; instant status window for information on cursor position, word count, etc.; instant function key access to menus or editor; options menu for setting character and screen colors, key repeat and delay rates, definable foreign symbols.

IBM and PS/2 are trademarks of International Business Machines Inc. *disk version only

DOCTOR Q&A ASCII

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Disk Transfer

I would like to run Radio Shack's Ernie's Magic Shapes, Cookie Monster's Letter Crunch *and* Grover's Number Rover *from disk. However, these programs were written to run from cassette only, and conflict with address assignments for the DOS. They were also written in absolute reference code and are not readily relocatable. Is there a way to transfer the code?*

John W. Hefler
Sausalito, CA

℞ I wrote a program called *TAPEFIX* that automatically modifies tape programs by appending a machine language loader. The program was published in the September 1983 issue of *HOT CoCo* in the article "Disk Utilities." For reprints, write CW Communications, 80 Pine St., Peterborough, NH.

Controlling Plug 'N Power

I seem to remember reading in RAINBOW *some instructions for controlling Radio Shack's Plug 'N Power Remote Control modules directly from* BASIC. *Could you tell me what issue this was in or where else I can find this information?*

Fred Kaplan
Topeka, KS

℞ A.B. Trevor wrote four articles on the original Plug 'N Power (X10) system for the CoCo: "Let CoCo Control Your Home Power Units," February 1983; "CoCo Clock, An Accurate Timepiece," April 1983; "X10 Protocol Theory, Home Power Control," June 1983; and "Keep Your Home On Schedule," August 1983.

Mitsubishi Drives on CoCo 2B

I have a CoCo 2B with HDS controller and one MPI 51 drive, running BDOS. I recently got a great deal on two Mitsubishi 80-track drives (double-sided). They won't work at present. Will my controller handle these drives and, if so, is there a DOS available to run them? I have a friend who says that patched ADOS will work. Is this true, and how is the patch done?

James L. Pogue
Marietta, GA

℞ ADOS comes with a configuration program, and 80-track drives is one of the options.

Altering BASIC

I have heard about the "all-RAM mode," which puts BASIC *into RAM. How do you edit* BASIC *with the all-RAM program, to change* BASIC *commands, for example.*

Daniel L. Miller
Oregon, OH

℞ On boot-up with the CoCo 3, or after running a ROM-to-RAM program on a 64K CoCo, you can either poke or use a machine language program to modify BASIC (addresses $A000 through $BFFF), Extended BASIC ($8000 through $9FFF) or Disk BASIC ($C000 through $DFFF).

CoCo and Commie Compatibility

I was wondering if there is a way that the CoCo can run Commodore 64 software.

Alvin Malone
Diaz, AZ

℞ Only if the program is in BASIC and you transfer the ASCII code. It will also most likely require some modification since the two BASICs are not totally compatible.

Color Blind Software

Is there a way to cause the correct color to come up in high resolution screens with software instead of by constantly pressing the reset button?

Richard Schultz
Carmichael, CA

℞ The four-plus color, 256-by-192 mode on the CoCo 1 and 2 machines is not officially supported in the 6847 SAM chip's documentation. The red/blue interchange on these machines cannot be controlled by software to automatically start the same way all the time.

OS-9 BBS Software

I'm looking for information on where to get BBS software that runs under OS-9 for our CoCo club in York, Pennsylvania. Can you help?

Christian B. Lutz
York Haven, PA

℞ An OS-9 BBS program called *PBBS 5.0* is available for $50 from Steve Roberson, (602) 884-7840. He recommends that the user have double-sided, 40-track drives at a minimum to use it. The source code is also available for an additional $50.

Botched Communications

I have tried and tried to communicate with my friend's OS-9 system using my modem, but each time I attempt to send underlines, boldface

---

Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

DISTO SUPER PRODUCTS

INTRODUCES
THE FANTASTIC SUPER CONTROLLER II

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II

- **Radio Shack/Tandy controller compatible.**
- **Works on all COCOs! 1, 2 or 3, with or without Multi-pak interface.**
- **One 24/28 pin socket, for 8K ROM, 2764, 27128 or 27256.**
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- **Gold Plated edge connectors.**
- **Under OS-9:**
  - • Buffered Read/Write sector achieved without halting the CPU.
  - • Continual use of keyboard even while Reading or Writing to disk.
  - • System's Clock no longer looses time during Read & Write.
  - • NMI is blocked and transferred to IRQ in software for low CPU overhead..
  - • Completely Interrupt driven for fast and smooth Multi-Tasking operations..
  - • Drivers (written by Keven Darling) for Level 1 and 2.

Suggested Retail Price $150 **Introductory Price $130**

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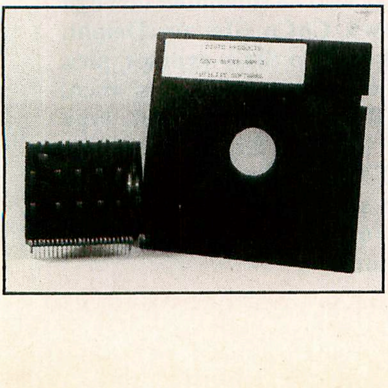
A superb controller. Along with the included C-DOS, plug-in three more software selectable 2764 or 27128 EPROMs burned to your liking.

The internal Mini Expansion Bus lets you add some incredible features to the controller. Disto Super Add-Ons were designed to fit neatly inside the Super Controller case.

DISTO SUPER RAM 3

Zero K	$ 29.95
Full 512K	$ 79.95



Now is the time to upgrade your COCO 3 to 512K of memory. Available with or without memory chips, the **Super Ram 3** board is easily installed inside the COCO. It is fully compatible with OS-9 Level 2 and is delivered with a software package (for BASIC) that includes: a printer spooler, a ramdisk, a memory test and an install/configure program for your system.

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characters, blinking characters, etc., all he gets is a homed cursor, and the rest of the special codes are ignored. Is this a bug or am I doing something wrong?

Tom Sanders
Parma, MI

℞ Thanks to Kevin Darling for coming up with a patch. Using *Modpatch -s*, patch CC3IO:

```
c 778 a7 12
c 779 c8 12
c 77a 1f 12
c 79f 4b 4e
c 9ef c8 12
c 9f0 1f 12
c a2d bd c0
v
```

Then use `Save` to make a new module or `Cobbler` a new patched disk.

CoCo 3 Keys

I just would like information on the CoCo 3 keyboard, specifically the F1, F2, CTRL and ALT keys. The CoCo manual doesn't cover them at all.

Kenneth Allen Leap
Norfolk, VA

℞ The ALT, CTRL, F1 and F2 keys occupy addresses 341, 342, 343 and 344 of the keyboard rollover table. When any one of these keys is pressed, the value at its corresponding address in the keyboard rollover table changes from 255 to 191. You can use this information in writing your own programs to detect when one of these keys are pressed.

Old Controller, New CoCo

I have an old silver-case CoCo (F board — 1982) and a silver-case upright disk drive, which connects to the CoCo by means of a black controller. I would like to upgrade to a CoCo 3, but don't want the expense of a new disk drive and controller. Can I use my old disk drive and controller on a CoCo 3? Would a Multi-Pak interface solve my problem?

Charles Waldron
Fairfield, CT

℞ Your current controller, if it requires 12 volts, will not work with a CoCo 3 unless it somehow gets the required 12 volts (the use of a Multi-Pak is one way to supply the necessary 12 volts). OS-9 Level II runs at 2 MHz, which cannot be handled by most of the 12-volt controllers. If you plan to use OS-9 Level II, I'd suggest getting a new controller. But, before you purchase either a Multi-Pak or a controller, check to see if you already have a 5-volt controller, for some of the earlier ones came with black housings.

Of Modem Paks and *DeskMate 3*

Do you know of a way to use Radio Shack's Direct Connect Modem Pak (Cat. No. 26-2228) through the "Telecom" section of DeskMate 3 *for the CoCo 3?*

A.M. Fransen
Calgary, Alberta

℞ After you swap disks and select telecommunications, specify `/M1` as your serial port.

64K Programs on 512K

I'm thinking about selling my 64K CoCo and buying the CoCo 3 with the 512K upgrade kit. If I do, will I be able to run my 64K programs on it with no problems?

Michael Duvall
Zanesville, OH

℞ Yes and no. Many of your 64K programs will work without modification, some will work with minor fixes, and some may not be worth the time or trouble to fix. The two major areas of problems are those programs that interfere with the GIME chip and Super Extended BASIC. The former problem is usually with a 64K boot routine messing up the GIME (e.g., the *VIP* series programs have this problem); it is relatively easy to fix. The latter problem can be more difficult since code may have to be extensively modified.

The Power of the Pins

The disk controller shipped with the original CoCo drives required a -5-volt supply from the CoCo to operate. The CoCo 2 does not have this source available on its cartridge connector. It is not possible to solve this problem using a Multi-Pak interface, since they are no longer available in Europe. Using some elementary electronic components, one can generate a -5-volt output coming from a 10-volt (or more) source. The only problem is the pin number on the cartridge connector. Would it be possible for you to inform me on this subject?

Dirk Vandekerckhove
B-8600 Menen, Belgium

℞ The power supplied at the ROM-pack port on the original CoCos was at 1) -12V.(100MA), 2) +12V(300 MA), and 9) +5V(300MA). There was no external -5-volt supply.

Mac Hard Drives

Can you make use of all the keys on the CoCo 3 keyboard on a CoCo 1 (F board)? If so, how complicated would it be? Could I hook up a Corvus 5 Mb hard drive, last used on a Macintosh, on my CoCo 1?

Rod Reinemer
Leaburg, OR

℞ The CoCo 3 keyboard is available from Radio Shack National Parts (Part No. AXX-0245). It should plug right in. With the proper interfacing hardware and software, you could use the drive. For starters, contact Owl-Ware and Burke & Burke, both advertisers in this magazine.

CoCo's British Brothers

I am likely to move to England soon and would like to know if my CoCo would work there using a locally bought TV. I know that they use a 220-volt, 50Hz electrical system and a TV system called PAL instead of our NTSC. Is there a British computer similar to the CoCo? Would it run all the CoCo's programs?

Zafer Deeb
Toledo, OH

℞ There is a PAL version of the CoCo sold in Europe that is software-compatible with the NTSC versions sold here. Also, there is a CoCo clone called the Dragon sold there that will run some of the CoCo's software. See the recent article "CoCoing Abroad," in the November 1987 RAINBOW, Page 32, by Marty Goodman and Don Hutchison.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

16K ECB

Barden's Buffer

An A'maze'ing Adventure

By William Barden, Jr.
Rainbow Contributing Editor

The Winchester Mystery House, found in Silicon Valley, California, started as a basic three-story Victorian home. Lucy Winchester, widow of the arms manufacturer, kept adding to it — as long as she kept building, she believed, she would never die.

There are stairways in the house that go nowhere, doors that open to sheer three-story drops, and doors that don't open at all. I was reminded of the house when writing this column — the maze game presented here is similar, and some of the problems I ran into while writing the program are analogous to those fake doors and empty rooms.

In this column I'll describe the maze game and its development and suggest ways you can add to it for your own version. You won't have to add much, though; by itself it's an interesting game, relying heavily on three-dimensional arrays and string processing, among other things.

The Scenario

It's like this: Lucy Winchester has kidnapped you. Groggily, you awake (with a nasty headache) to find yourself in an interior room of the house. In order to find your way out, you'll have to negotiate the various rooms, floors and dead ends. (If you don't like that one, another scenario involves an abduction by aliens that look like clones of CoCo Cat — I'll leave it to you to establish your own fantasy.) In any event, you're in the middle of a three-dimensional box, as shown in Figure 1, and must find your way out to one of the four sides, the top or bottom.

Within the maze is a series of rooms. Each room can have a door on the left, a door on the right, a door in front of you, a door behind you, an opening in the ceiling to the floor above (no staircases here) or an opening in the floor to the floor below. Rooms may have any combination of these doors and openings — one room may have no doors, but another may have two doors and a ceiling opening. A room with every door and opening is presented in Figure 2.

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

Game Play

By pressing keys you can move to adjacent rooms and go up or down one floor. When you go through a door, you may change directions. If you select the door to the right, for

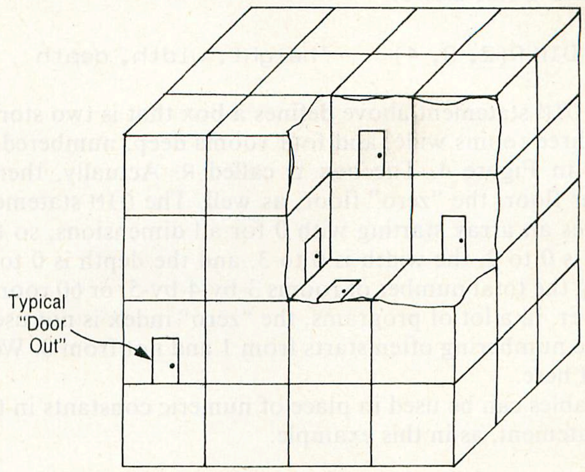


Figure 1: Three-Dimensional Box or Maze (Cut-Away View)

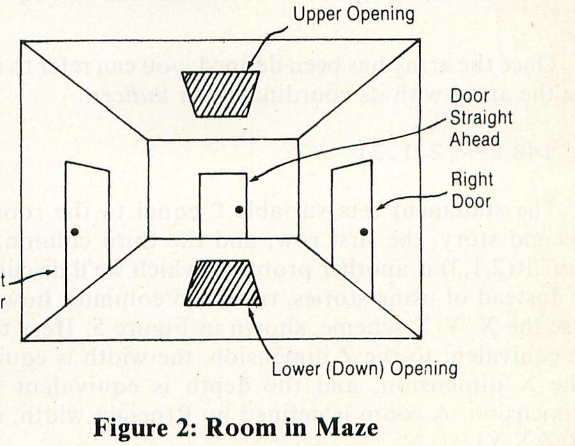


Figure 2: Room in Maze

example, you'll be facing the new room at a right angle to the old direction. Pressing these keys takes you from room to room:

S	through the door straight ahead
B	through the door behind you
L	through the door on your left
R	through the door on your right
U	through ceiling opening to floor above
D	through floor opening to floor below

Designing the Maze Game

Let's start off by assuming that the maze is a box, consisting of height, width and depth. We'll assume that the height must be greater than one story and the width and depth greater than two.

We could number each of the rooms, as shown in Figure 3, starting at the upper-left corner of the box and working down toward the lower-right corner. Numbering might work like the numbering of hotel rooms, which use the floor number as their first number — rooms 401 through 412 for rooms on Floor 4, for example.

This is a cumbersome way of identifying the rooms, however. Is Room 412 toward the front or back of the building? Is Room 401 on the left or right side? Another way to define the rooms is to use a *three-dimensional array.* An array is defined by the dimension statement (`DIM`) in Extended Color BASIC.

```
100 DIM R(2, 3, 4)      'height, width, depth
```

The `DIM` statement above defines a box that is two stories high, three rooms wide, and four rooms deep, numbered as shown in Figure 4. The box is called `R`. Actually, there's another floor, the "zero" floor, as well. The `DIM` statement allocates an array starting with 0 for all dimensions, so the height is 0 to 2, the width is 0 to 3, and the depth is 0 to 4, making the total number of rooms 3-by-4-by-5, or 60 rooms. However, in a lot of programs, the "zero" index is not used, because numbering often starts from 1 and not from 0. We'll do that here.

Variables can be used in place of numeric constants in the `DIM` statement, as in this example:

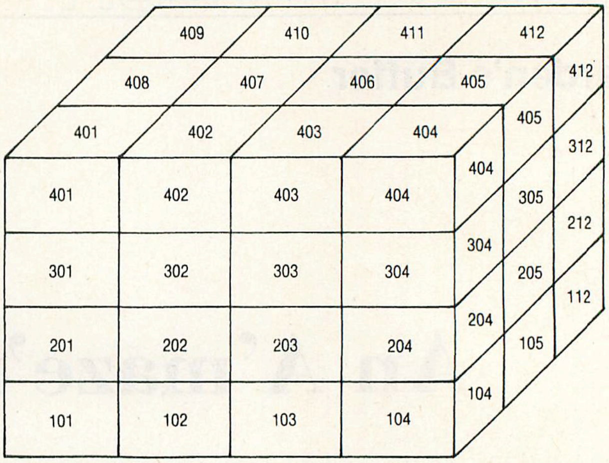
```
100 INPUT H             'get height
110 INPUT W             'get width
120 INPUT DP            'get depth
130 DIM R(H,W,DP)       'allocate array
```

Once the array has been defined, you can refer to any room in the array with its coordinates, or *indices*:

```
140 C=R(2,1,3)
```

The statement sets variable `C` equal to the room on the second story, the first row, and the third column. What is "in" R(2,1,3) is another problem, which we'll discuss shortly.

Instead of using stories, rows and columns, however, let's use the X/Y/Z scheme, shown in Figure 5. Here the height is equivalent to the Z dimension, the width is equivalent to the X dimension, and the depth is equivalent to the Y dimension. A room is defined by R(height,width, depth) or R(Z,X,Y).



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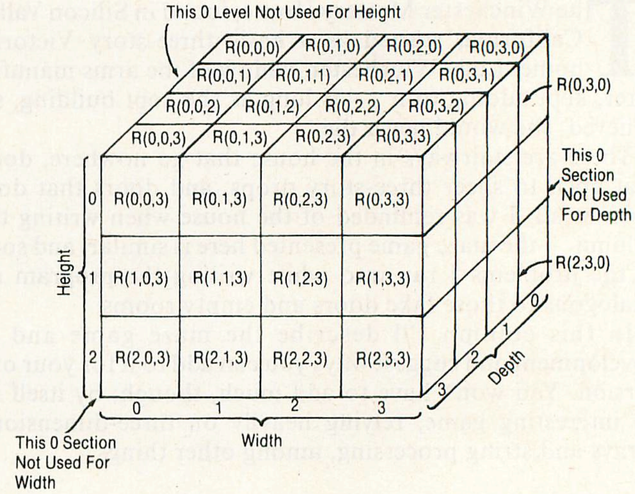
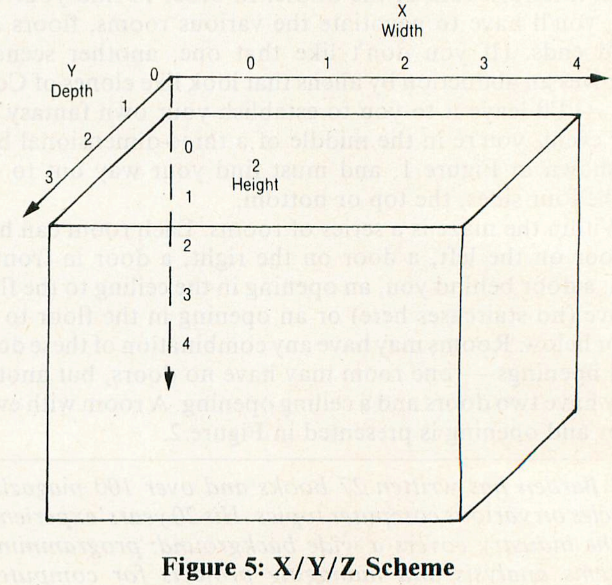
104

Figure 3: Hotel Room Numbering Scheme



This 0 Level Not Used For Height
R(0,0,0)
R(0,1,0)
R(0,2,0)
R(0,3,0)
R(0,0,1)
R(0,1,1)
R(0,2,1)
R(0,3,1)
R(0,3,0)
R(0,0,2)
R(0,1,2)
R(0,2,2)
R(0,3,2)
R(0,0,3)
R(0,1,3)
R(0,2,3)
R(0,3,3)
This 0 Section Not Used For Depth
0
R(0,0,3)
R(0,1,3)
R(0,2,3)
R(0,3,3)
Height
1
R(1,0,3)
R(1,1,3)
R(1,2,3)
R(1,3,3)
R(2,3,0)
0
1
2
R(2,0,3)
R(2,1,3)
R(2,2,3)
R(2,3,3)
2
3
Depth
0
1
2
3
This 0 Section Not Used For Width
Width

Figure 4: DIM Numbering



X
Width
0
1
2
3
4
Y
Depth
0
1
2
3
0
2
Height
1
2
3
4

Figure 5: X/Y/Z Scheme

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Table 1: Decimal, Hexadecimal and Binary Values

0	&H00	000000	16	&H10	010000	32	&H20	100000	48	&H30	110000
1	&H01	000001	17	&H11	010001	33	&H21	100001	49	&H31	110001
2	&H02	000010	18	&H12	010010	34	&H22	100010	50	&H32	110010
3	&H03	000011	19	&H13	010011	35	&H23	100011	51	&H33	110011
4	&H04	000100	20	&H14	010100	36	&H24	100100	52	&H34	110100
5	&H05	000101	21	&H15	010101	37	&H25	100101	53	&H35	110101
6	&H06	000110	22	&H16	010110	38	&H26	100110	54	&H36	110110
7	&H07	000111	23	&H17	010111	39	&H27	100111	55	&H37	110111
8	&H08	001000	24	&H18	011000	40	&H28	101001	56	&H38	111000
9	&H09	001001	25	&H19	011001	41	&H29	101001	57	&H39	111001
10	&H0A	001010	26	&H1A	011010	42	&H2A	101010	58	&H3A	111010
11	&H0B	001011	27	&H1B	011011	43	&H2B	101011	59	&H3B	111011
12	&H0C	001100	28	&H1C	011100	44	&H2C	101100	60	&H3C	111100
13	&H0D	001101	29	&H1D	011101	45	&H2D	101101	61	&H3D	111101
14	&H0E	001110	30	&H1E	011110	46	&H2E	101110	62	&H3E	111110
15	&H0F	001111	31	&H1F	011111	47	&H2F	101111	63	&H3F	111111

What's in a Room

What *is* in a room? We know that the array `R` is a numeric array and each room or element contains a numeric value. How does that numeric value represent the doors and openings of the room? One way is to use a string array and then form a string of words to define what the room looks like. The string could be `"left door, right door, ceiling opening"`, for example. To be more concise, we could say `"LRU"` for `"Left door, Right door, and Upper opening"`.

Another way of representing the room, though, is with *bits* — binary digits. We know that there are only six possible doors and openings in a room (right door, left door, the door in front, the door behind, the ceiling opening, and the floor opening). These six doors and openings can be represented in six bits, as shown in Figure 6. A bit with a value of 1 indicates that the door or opening is present, while a 0 bit indicates that the door or opening is not there.

The six bits always have the same meaning as shown in the figure. They occupy the same position in the value. A value of 100101, for example, means U (upper), L(left), and R(right).

To calculate the decimal value for each bit, just add 32, 16, 8, 4, 2, or 1 together, depending on which bit is present. In the example of 100101, you'd have 32+4+1=37 decimal. For this room, then, the value that represents an upper opening, left door and right door could be set by this line:

```
200 R(2,1,2) = 37
```

The `2,1,2` indices for Z, X and Y (height, width and depth) are just three arbitrary values we happened to choose.)

The value used for a room could range from 0 (no doors or openings) to 63 (all doors and ceiling and floor openings). Another way of specifying this value is in *hexadecimal* or Hex, which is a shorthand way of representing binary. In this case, decimal values of 0 through 63 are represented by Hex values of 0 through &H3F, as shown in Table 1.

The numbers in the first column of the table are the decimal numbers; the numbers in the second column, with the &H prefix, are the hexadecimal equivalents; and the numbers in the last are the binary equivalents.

Drawing the Rooms

At this point we have a three-dimensional box or array, with each element of the array containing a value from 0 to 63 that indicates the doors and openings. To draw any room from the room value, we first check each bit of the value and then draw the appropriate door or opening. But before that, we have to draw the outline of the room, since that stays constant for any room. The BASIC code for drawing a room is found in lines 220 through 470 of Listing 1, but here is a condensed presentation of those lines to provide a clearer understanding:

```
100 SCREEN 1,0                          'graphics screen
110 PMODE 4                             '256 x 192
120 COLOR 2,3                           'black on green
130 PCLS                                'clear screen
140 LINE(0,0)-(255,191),PSET,B          'border
150 C=R(Z,X,Y)                          'value, 0 to 63
160 GOSUB 710                           'outline
170 IF (C AND 32) 0 THEN GOSUB 1110     'upper
180 IF (C AND 16) 0 THEN GOSUB 1030     'lower
190 IF (C AND 4) 0 THEN GOSUB 790       'left door
210 IF (C AND 2) 0 THEN GOSUB 950       'front door
220 IF (C AND 1) 0 THEN GOSUB 870       'right door
```

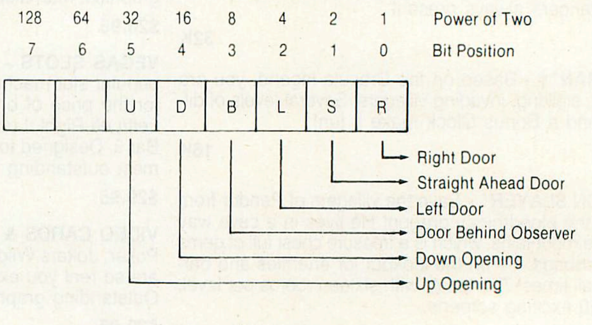

Figure 6: Bit Codes for Doors and Openings

Sugar Software

Sugar Software Gazette

Volume 1 Issue 2 Winter, 1988

Calligrapher New Fonts

Sugar Software's popular CoCo Calligrapher program now has a new set of 5 fonts. The text of this ad was printed with the OS9 Calligrapher and the condensed ROMAN font.

Like all of the current 54 fonts, these are variable width for a more pleasing appearance. The new fonts are the smallest of all (less than .2 inches tall) and are more useful for Desktop Publishing:

Roman

Italics

Digital

Old World

Block

These five new fonts are available in either RSDOS or OS9 format. The introductory price for the set on disk or tape (RSDOS) is $18.50, good through March 31st. The font set requires that you have the CoCo or OS9 Calligrapher ($24.95).

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The Information Management System, TIMS, is a very easy-to-use database program. TIMS is used to create files of things. You decide what you want to file; it could be articles, collections (coins, stamps, video tapes, etc.), anything you might put into an index card file. The advantage to computerizing your files is that you can quickly search the entire file in a fraction of a second; sort the file on any of the fields (up to 3) in a few seconds; easily update your fields or records; and print your file, or a portion of it is a format you design.

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TIMS Mail is a special version of TIMS that is tailored to maintaining a file of names and addresses and printing mailing labels instead of reports. Many of the standard label sizes are supported including 2 or 3 across. TIMS Mail address files may be used with TIMS.

TIMS UTILITY

The TIMS Utility program enhances the other programs. It allows multi-term searches of your files, global modification and deletion of records and file splitting.

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TIMS and TIMS Mail are $19.95 each. TIMS Utility is $14.95. The TIMS Combo Package is $34.95, saving you about $20! At Sugar Software, tape and disk prices are the same.

The Calligrapher Programs - Both the OS9 and CoCo Calligrapher come with three ½-inch fonts: Old English, Gay Nineties and Cartoon. Both come with support for Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter printers. Both print the same fonts.

CoCo Calligrapher - Tape or Disk; $24.95. **OS9 Calligrapher** - Requires OS9 Level I or II; Disk only; $24.95.

TIMS - Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Tape/Disk; $19.95.

TIMS Mail - Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Tape/Disk; $19.95.

TIMS Utility - Utility companion for TIMS and TIMS Mail to allow multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; $14.95.

TIMS Combo Package - All three of the above programs: TIMS, TIMS Mail and TIMS Utility on one disk - $34.95.

This ad was composed using ½-inch **Reversed Old English** for the headline, ¼-inch **Block** for headers and .2-inch **Roman** for the body. A 2½-inch column was printed and cut to three columns. *Specify OS9 or CoCo (RSDOS) when ordering Calligrapher or fonts.*

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The subroutine at Line 710 of Listing 1 draws the room outline as if you were looking into the room from the doorway you've just passed through. The other subroutines draw individual doors or the ceiling and floor openings. The room outline is always drawn, but the other subroutines are called only if the proper bit is set in the value. The bit for each is tested by `AND`ing the room value with the value of 32, 16, 4, 2, or 1. The `AND` returns a non-zero result if the bit is set and a zero result if the bit is not set. The door "behind" the observer is not drawn, because it is not visible in the view of the room. It's still always there, however, because it's one of the ways to get into the room.

The code for drawing the doors and openings uses a series of `LINE` statements. A `CIRCLE` statement in the door subroutines draws a doorknob, and `PAINT` colors the doorknob black. Ceiling and floor openings are painted black, as well. The code for drawing the shapes is shown in lines 700 through 1700 of Listing 1.

Moving From Room to Room

The code in lines 700 through 1700 draws a single room, but what about moving through the maze? One way to move through the maze is to use a single key press to go either up, down, back, left, straight ahead or right; keys U, D, B, L, S and R are used to move in those directions. An `INKEY$` command allows you to read in a key, as shown in lines 480 through 500 of Listing 1:

```
480 A$=INKEY$: IF A$="" THEN GOTO 480
490 A=INSTR("UDBLSRH",A$)
500 IF A=0 THEN GOTO 480
```

The code loops at Line 480 until a key is pressed. The `INSTR` statement then looks at the string `UDBLSRH` to find the key letter in `A$`. If the letter is found, variable `A` is set to the position in the `UDBLSRH` string of 1 through 7. If the letter is not found, `A` is set to 0 and the key press is ignored.

There's a big problem, though, in moving from room to room. The values in the elements of each array are based on an observer facing "north" — right really means east, left is west, and so forth. However, when you're moving through the rooms, you're turning right or left to go through the right or left doors, or turning completely around to return through the door you just entered. (In going through the door in front of you, you keep the same direction, as you do when going up or down.) When you turn and walk through the door, you may be facing another direction. If the room were drawn from the original data, the view would always be the one you see facing north and not the one you see walking through the door (see Figure 7).

The answer to this problem is a conversion of the original room doors and openings to those corresponding to the observer's view. To do this, a *direction* variable has to be maintained. Let's use variable `D` to represent the direction. Again, we could have used `N`, `E`, `S` and `W` in a string variable, but our choice was:

0 = North
1 = East
2 = South
3 = West

The conversion is common sense. If an observer enters a room and faces north, the right and left sense of the original room values apply. However, if an observer enters a room facing east, the door straight ahead is actually the "right" door of the original value; the door to the right is actually the "back" door of the original value, and so forth. Facing south and west requires the same type of conversion. Here's a conversion table:

```
C$="20154130540235431254"
```

This "table" requires some explanation. It's divided into four parts for north, east, south and west:

20154	13054	02354	31254
N	E	S	W

The single digit represents the bit that should be tested for the door or opening — Bit 5 (most significant) through Bit 0 (least significant). The order of the string is `LRSUD`, for left, right, straight, up or down. Facing north, for example, Bit 2 should be tested for the left door. Facing south, however, Bit 0 should be tested for the left door, as the original right door is now viewed as the left door. Confused? It *is* confusing and there's probably no way to simplify it unless you sit down and draw some sample cases yourself.

Using the `C$` "table," the direction variable `D` and the code for the movement key (U, D, B, L, S, or R), it's easy to go through the conversion to draw the room as it appears to an observer in the doorway. Lines 360 through 390 of Listing 1 do this:

```
360 C=R(Z,X,Y)
370 GOSUB 710
380 M=INT(2^VAL(MID$,C$,(D*5)+1,1)))
390 IF (C AND M) <> 0 THEN GOSUB 790
```

This code accomplishes the same thing as the previous code — it draws the left door of the room, but it first converts what the observer sees as the left door to the original door. The `MID$` portion of the statement gets the bit position; the

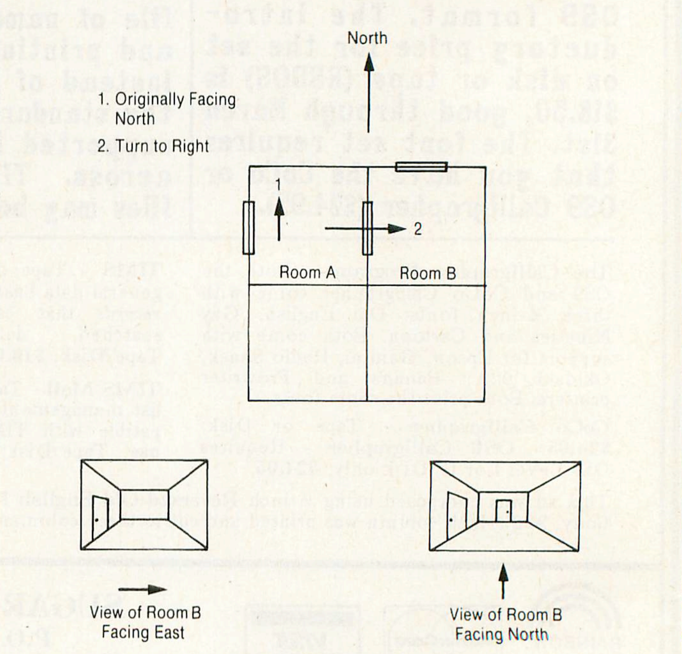
North
1. Originally Facing North
2. Turn to Right
1
2
Room A
Room B
View of Room B Facing East
View of Room B Facing North

Figure 7: Changing Directions

VAL portion converts the single character to a numeric value; the 2^ portion changes this numeric value to a power of 2 (32, 16, 8, 4, 2, or 1); and the INT portion makes certain that the power of 2 is an integer value. The result is put into variable M, a "mask" variable with a value of 32, 16, 8, 4, 2, or 1. The modified code for drawing the room is found in lines 310 through 500 of Listing 1.

Once the room is drawn, the player can input a key to determine which direction he wants to go — U, D, B, L, S or R. One problem with this, however, is that the player can input a direction that isn't allowed. He may try to go through a left door where there *isn't* a door (on the left), for example. This cannot be allowed. To prevent it, a check must be made of allowable directions based on the current direction, the intended direction and the openings that are present. The code in lines 480 through 590 accomplishes the conversion.

The value C in Line 590 is the value of the current room in the array. Variable A is a mask value of 32, 16, 8, 4, 2 or 1 derived from the "543 . . . 321" string by the current direction D (1, 1, 2 or 3) and the A code. If the AND of X and A is zero, there is no corresponding bit in the array value and the key is ignored. If the AND is non-zero, then the direction the player wants to move is valid.

If the player has entered a valid direction, the next step is to change the current direction in the variable D. This is done by adding 1 for a move to the right, adding 2 for a move backward, or subtracting 1 for a move to the left. Moving up or down does not alter the direction. The second thing done is adjusting Z, X or Y to reflect the move. Moving up subtracts 1 from the current Z value, and moving down adds 1 to it. If the direction is north (D=0), 1 is subtracted from Y. If the direction is east (D=1), 1 is added to X. If the direction is south (D=2), 1 is added to Y. If the direction is west (D=3), 1 is subtracted from X.

A check is then made of the current Z,X,Y. If any of the three variables is equal to 0, the player has moved out of the "box" and the game is over. If any of the three variables is equal to a value one greater than the dimension limit height, width or depth, the player has moved out of the box, as well. If the player is still within the box, the process repeats. The code for these actions is shown in Listing 1, along with the code described above.

How to Generate a Maze

The above discussion assumes that a maze exists. But who created it? Not me — you'll have to create your own.

One way to create a maze is to sit down with paper and pencil and draw one out, adding a random number of doors and openings in each room. A better way, and the way I opted for, was to have the CoCo generate a three-dimensional maze!

The resulting FINDMAZE program shown in Listing 2 uses the same structure we've been discussing above, an array of three dimensions with a height (Z) greater than 1, a width (X) greater than 2, and a depth (Y) greater than 2. The first portion of code defines an array R of dimensions height, width and depth.

The next portion of code fills all of the "rooms" of the array with a random arrangement of doors and openings. Since this value is from 0 to 63, an RND(64)-1 expression produces the proper random value.

The rooms are now filled with random doors and openings. However, there's a slight problem. Because adjacent rooms — rooms next to each other — are created randomly, there may be a door that leads into an adjoining room, but no door

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going back into the original room. Imagine this scenario: The player presses R for right to go through a door. Upon entering the room he sees no doors or openings (a random value of 0). Thinking he'll go back the way he came, he presses B, which should return him to the previous room, but facing the opposite direction. Instead, he can't get back because there is no door!

To solve this problem, a scan is made of all rooms. If there is a door to the right but no door to the left in the adjoining room, one is added. Conversely, if there is a door to the left but no door to the right in the preceding room, one is added. The same actions are taken for "up" and "down" openings and for doors that are straight ahead and behind.

Next, the center room is found by setting `Z`, `X` and `Y` equal to the integer value of the dimension divided by 2. Variable `N` is then set to 0, for north.

The coding at the heart of `FINDMAZE` does a "random walk" through the maze. Starting at the center, a direction `N` is chosen at random, including an up/down direction. However, if the direction represents a return back to a room it was in previously, the direction is discarded and a new direction found (travel through the maze doesn't reverse itself).

Variables `TZ`, `TX` and `TY` are set equal to `Z`, `X` and `Y`. These variables represent a "trial room." Based on the current direction of travel (`N`), `Z`, `X` or `Y` is adjusted for the direction. The adjustment defines a new room. A check is made of all the old rooms (stored in Array `S`) to make certain that the path does not come back to a previous room. If it does, a new direction is taken and the trial room discarded.

If the trial room represents a room that is out of the maze (`Z`, `X` or `Y` = 0, or `Z`, `X` or `Y` = dimension+1), the trial room is also discarded, providing that less than 30 percent of the rooms have been used in the path of travel.

If the trial room is OK, then a doorway or opening is "blasted through." Of course, one might exist without having to set a new one, but an `OR` of the proper bit sets one, regardless.

There's a problem with blasting a new doorway similar to that of the generation of random rooms, however. If no doorway or opening exists on the other side, the player will not be able to reverse himself in going through the maze path. The corresponding door or opening on the new room is therefore blasted through as well by a second `OR`.

If the outside of the maze is not reached, the process is repeated — the program wends through the maze in erratic fashion, blasting a path through random rooms until the outside is reached. Each time a new room is computed, it is added to the "previous rooms" Array `S`, so that a check may be made of trial rooms. Also, a record of the direction taken is recorded in string `A$`. At the end of the random walk, `A$` holds the sequence to follow to get out of the maze, such as `"DLLSSULSRULDDSS"`.

At the end of the `FINDMAZE` program the complete room array is saved to a disk file, along with the array dimensions and path sequence. This disk file is read into the `NEWMAZE` program to "initialize" the maze.

Using FINDMAZE and NEWMAZE

To play a game, first run `FINDMAZE` to define a maze. A good height, width and depth to try is 5-by-5-by-5 — about 38 rooms will be present in the maze path. You'll see the room coordinates displayed on the screen as they are calculated. The program will then ask you for a disk filename for the maze data, after which the maze data will be written out. Any filename will do.

Next, run `NEWMAZE` and reply with the filename just created. The program loads the maze file and displays the center room. Use the U, D, B, L, S and R keys to move through the maze. Any direction that is not possible will be ignored. If you're stuck, use the H key to list the directions to travel — it displays the `A$` string from `FINDMAZE`.

There are about 3,800,000,000,000 combinations for a 5-by-5-by-5 maze, so the game is not easy. You might try making a map as you travel through the maze!

`FINDMAZE` and `NEWMAZE` are "core" programs that do the job, but there is room for embellishments. How about a way of marking a wall with a paint that remains visible, but only for 10 moves? What about a monster pursuing you through the maze, with a heartbeep sound that gets more frequent, louder and higher-pitched as it approaches?

Another thing that could be added is a "vanish button" that transports you to another room if the monster appears to be too close — maybe a "button" with a battery that takes 20 moves to recharge? How about adding some of those "trap" rooms that have no way out? Some rooms might open out onto sheer drops, just like the Winchester House. The possibilities are endless. ☐

390 ......111 970 111
550 ......20 END 122
710 111

Listing 1: `NEWMAZE`

```
100 'EXECUTE A MAZE GAME
110 '
120 'READ MAZE FILE
130 INPUT"MAZE FILE NAME:";MF$
140 OPEN "I",#1,MF$
150 INPUT#1,H,W,DP
160 DIM R(H,W,DP)
170 FOR Z=1 TO H:FOR X=1 TO W:FO
R Y=1 TO DP
180 INPUT#1,R(Z,X,Y)
190 NEXT:NEXT:NEXT
200 INPUT#1,B$
210 '
220 'INITIALIZE
230 SCREEN 1,0
240 PMODE 4
250 COLOR 2,3
260 PCLS
270 Y=INT(DP/2)
280 X=INT(W/2)
290 Z=INT(H/2)
300 D=0
310 C$="20154130540235431254"
320 '
330 'MAIN LOOP - DO UNTIL OUT
340 PCLS
350 LINE(0,0)-(255,191),PSET,B
360 C=R(Z,X,Y)
370 GOSUB 710
380 M=INT(2^VAL(MID$(C$,(D*5)+1,
1)))
390 IF (C AND M ) <> 0 THEN GOSU
B 790
400 M=INT(2^VAL(MID$(C$,(D*5)+2,
1)))
410 IF (C AND M ) <> 0 THEN GOSU
B 870
420 M=INT(2^VAL(MID$(C$,(D*5)+3,
1)))
430 IF (C AND M ) <> 0 THEN GOSU
B 950
440 M=INT(2^VAL(MID$(C$,(D*5)+4,
1)))
450 IF (C AND M ) <> 0 THEN GOSU
B 1110
460 M=INT(2^VAL(MID$(C$,(D*5)+5,
1)))
470 IF (C AND M ) <> 0 THEN GOSU
B 1030
480 A$=INKEY$: IF A$="" THEN GOT
O 480
490 A=INSTR("UDBLSRH",A$)
500 IF A=0 THEN GOTO 480
510 IF A$<>"H" THEN GOTO 580
520 SCREEN 0,0
530 PRINT "THE SEQUENCE IS:"; B$
540 PRINT "PRESS ANY KEY TO CONT
INUE"
550 A$=INKEY$: IF A$="" THEN GOT
O 550
560 SCREEN 1,0
570 GOTO 480
580 A=INT(2^(VAL(MID$("543210542
103541032540321",(D*6)+A,1))))
590 IF (C AND A ) = 0 THEN GOTO
480
600 IF A$="U" THEN Z=Z-1 ELSE IF
 A$="D" THEN Z=Z+1
610 IF A$="R" THEN D=D+1: IF D=4
 THEN D=0
620 IF A$="B" THEN D=D+2: IF D>3
 THEN D=D-4
630 IF A$="L" THEN D=D-1: IF D=-
1 THEN D=3
640 IF (A$="U") OR (A$="D") THEN
 GOTO 660
650 IF D=0 THEN Y=Y-1 ELSE IF D=
1 THEN X=X+1 ELSE IF D=2 THEN Y=
Y+1 ELSE X=X-1
660 IF NOT((X=0) OR (X=W+1) OR (
Y=0) OR (Y=DP+1) OR (Z=0) OR (Z=
H+1)) THEN GOTO 690
670 PRINT "YOU'RE OUT! HIT ANY K
EY TO PLAY ANOTHER"
680 A$=INKEY$: IF A$="" THEN GOT
O 680 ELSE GOTO 230
690 GOTO 340
700 '
710 'DRAW ROOM OUTLINE
720 LINE (80,60)-(176,132),PSET,
B
```

```
730 LINE (0,0)-(80,60),PSET
740 LINE (0,191)-(80,132),PSET
750 LINE (255,0)-(176,60),PSET
760 LINE (255,191)-(176,132),PSE
T
770 RETURN
780 '
790 'DRAW LEFT DOOR
800 LINE (26,172)-(26,70),PSET
810 LINE (52,152)-(52,78),PSET
820 LINE (26,70)-(52,78),PSET
830 CIRCLE (34,121),3
840 PAINT (34,121),0
850 RETURN
860 '
870 'DRAW RIGHT DOOR
880 LINE (203,152)-(203,78),PSET
890 LINE (229,172)-(229,70),PSET
900 LINE (203,78)-(229,70),PSET
910 CIRCLE (222,121),3
920 PAINT (222,121),0
930 RETURN
940 '
950 'DRAW DOOR STRAIGHT AHEAD
960 LINE (112,132)-(112,84),PSET
970 LINE (144,132)-(144,84),PSET
980 LINE (112,84)-(144,84),PSET
990 CIRCLE (138,110).3
1000 PAINT (138,110),0
1010 RETURN
1020 '
1030 'DRAW LOWER OPENING
1040 LINE(100,172)-(156,172),PSE
T
1050 LINE (109,152)-(147,152),PS
ET
1060 LINE (100,172)-(109,152),PS
ET
1070 LINE (156,172)-(147,152),PS
ET
1080 PAINT(128,162),0
1090 RETURN
1100 '
1110 'DRAW UPPER OPENING
1120 LINE(100,24)-(156,24),PSET
1130 LINE(109,44)-(147,44),PSET
1140 LINE(100,24)-(109,44),PSET
1150 LINE(147,44)-(156,24),PSET
1160 PAINT (128,34),0
1170 RETURN
```

```
330 .......12
460 ......157
670 ......234
END ......105
```

Listing 2: FINDMAZE

```
100 'CONSTRUCT A 3-D MAZE
110 '
120 D$="SRBLDULSRBDUBLSRDURBLSDU
"
130 DIM S(200)
140 '
150 'INPUT DIMENSIONS, GET ARRAY
160 INPUT "HEIGHT:";H
170 IF H<2 THEN GOTO 160
180 INPUT "WIDTH:";W
190 IF W<3 THEN GOTO 180
200 INPUT "DEPTH:";DP
210 IF DP<3 THEN GOTO 200
220 DIM R(H,W,DP)
230 '
240 'FILL ROOMS WITH RANDOM DOOR
S
250 FOR Z=1 TO H:FOR X=1 TO W:FO
R Y=1 TO DP
260 R(Z,X,Y)=RND(64)-1
270 IF Y=1 THEN R(Z,X,Y)=R(Z,X,Y
) AND &H3D
280 IF Y=DP THEN R(Z,X,Y)=R(Z,X,
Y) AND &H37
290 IF X=1 THEN R(Z,X,Y)=R(Z,X,Y
) AND &H3B
300 IF X=W THEN R(Z,X,Y)=R(Z,X,Y
) AND &H3E
310 IF Z=1 THEN R(Z,X,Y)=R(Z,X,Y
) AND &H1F
320 IF Z=H THEN R(Z,X,Y)=R(Z,X,Y
) AND &H2F
330 NEXT:NEXT:NEXT
340 FOR Z=1 TO H: FOR X=1 TO W:
FOR Y=1 TO DP
350 IF Z=1 THEN GOTO 360 ELSE IF
 (R(Z-1,X,Y) AND 16) <> 0 THEN R
(Z,X,Y) = R(Z,X,Y) OR 32
360 IF X=1 THEN GOTO 370 ELSE IF
 (R(Z,X-1,Y) AND 1) <> 0 THEN R(
Z,X,Y) = R(Z,X,Y) OR 4
370 IF Y=1 THEN GOTO 380 ELSE IF
 (R(Z,X,Y-1) AND 8) <> 0 THEN R(
Z,X,Y) = R(Z,X,Y) OR 2
380 IF Z=H THEN GOTO 390 ELSE IF
 (R(Z+1,X,Y) AND 32) <> 0 THEN R
(Z,X,Y) = R(Z,X,Y) OR 16
390 IF X=W THEN GOTO 400 ELSE IF
 (R(Z,X+1,Y) AND 4) <> 0 THEN R(
Z,X,Y) = R(Z,X,Y) OR 1
400 IF Y=DP THEN GOTO 410 ELSE I
F (R(Z,X,Y+1) AND 2) <> 0 THEN R
(Z,X,Y) = R(Z,X,Y) OR 8
410 NEXT:NEXT:NEXT
420 '
430 'FIND CENTER ROOM
440 F=0
450 D=0
460 Y=INT(DP/2)
470 X=INT(W/2)
480 Z=INT(H/2)
490 S(1)=Z: S(2)=X: S(3)=Y: JE=3
500 PRINT Z;X;Y
```

```
510 A$=""
520 '
530 'MAIN LOOP
540 'DO A RANDOM WALK
550 N=RND(6)-1
560 IF F=0 THEN F=1: GOTO 640
570 IF (N=2 AND D=0) OR (N=0 AND
D=2) OR (N=1 AND D=3) OR (N=3 A
ND D=1) THEN GOTO 550
580 TZ=Z: TX=X: TY=Y
590 IF N=5 THEN TZ=TZ-1 ELSE IF
N=4 THEN TZ=TZ+1 ELSE IF N=3 THE
N TX=TX-1 ELSE IF N=2 THEN TY=TY
+1 ELSE IF N=1 THEN TX=TX+1 ELSE
 TY=TY-1
600 FOR J=1 TO JE STEP 3
610 IF (TZ=S(J)) AND (TX=S(J+1))
 AND (TY=S(J+2)) THEN GOTO 550
620 NEXT J
630 IF (TX=0) OR (TX=W+1) OR (TY
=0) OR (TY=DP+1) OR (TZ=0) OR (T
Z=H+1) THEN IF JE<(H*W*DP)/3 THE
N GOTO 550
640 IF N=0 THEN M=2 ELSE IF N=1
THEN M=1 ELSE IF N=2 THEN M=8 EL
SE IF N=3 THEN M=4 ELSE M=2^N
650 R(Z,X,Y)=R(Z,X,Y) OR M
660 IF M=32 THEN M=16 ELSE IF M=
16 THEN M=32 ELSE IF M=8 THEN M=
2 ELSE IF M=2 THEN M=8 ELSE IF M
=4 THEN M=1 ELSE IF M=1 THEN M=4
670 A$=A$+MID$(D$,D*6+(N+1),1)
680 IF N=5 THEN Z=Z-1 ELSE IF N=
4 THEN Z=Z+1
690 IF N=3 THEN X=X-1 ELSE IF N=
2 THEN Y=Y+1 ELSE IF N=1 THEN X=
X+1 ELSE IF N=0 THEN Y=Y-1
700 S(JE+1)=Z: S(JE+2)=X: S(JE+3
)=Y: JE=JE+3
710 IF NOT((Z=H+1) OR (Y=DP+1) O
R (X=W+1)) THEN R(Z,X,Y)=R(Z,X,Y
) OR M
720 IF N<4 THEN D=N
730 PRINT Z;X;Y
740 IF (Z=0) OR (Z=H+1) OR (Y=0)
 OR (Y=DP+1) OR (X=0) OR (X=W+1)
 THEN GOTO 770 ELSE GOTO 550
750 '
760 'STORE MAZE IN MAZE FILE
770 INPUT"MAZE FILE NAME:";MF$
780 OPEN "O",#1,MF$
790 PRINT#1,H,W,DP
800 FOR Z=1 TO H: FOR X=1 TO W:
FOR Y=1 TO DP
810 PRINT#1,R(Z,X,Y)
820 NEXT:NEXT:NEXT
830 PRINT#1,A$
840 CLOSE
```

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KISSable OS-9

Using a Fourth-Generation Database Language

By Dale L. Puckett
Rainbow Contributing Editor

I saw the future at RAINBOWfest Princeton. Unfortunately, I still haven't had a chance to attack *Multi-Vue* with my own mouse and keyboard — but it looked very nice under the command of Mark Siegel, Tandy's software product manager. It may be just what we need to get more people on the OS-9 team.

This month we'll take a look at *Sculptor*, a fourth-generation database application. We will also spotlight the first user contribution to *KISSDraw*, our CoCo community OS-9 programming project. But first we'll share a few tips from readers and look at the new enhanced CoCoBin standard proposed by *Wiz* author Bill Brady.

We received a helpful hint from Jay Truesdale on RAINBOW's Delphi OS-9 Online SIG, who writes:

"I ran across this gem in the OS-9/68000 manual at work, so I ran home and tried it with OS-9/6809. It worked beautifully. There is a reference to this technique on Page 3-9 of the OS-9 Level II manual, but it is vague and obscure. If you are pretty far down in a directory tree and want to change to another working directory temporarily, try this. Instead of typing two long paths to change your working data directory with `chd`, try this line:

```
OS9: (chd /newworkingdirpath)
```

"This OS-9 command line creates a new shell, which uses `newworkingdirpath` as its current data directory.

"To return to your previous directory, press CTRL-ESC on the Color Computer 3. This action will kill the new shell and return you to the shell using your original working directory."

Good research! Neat trick! Thanks, Jay! Another helpful hint for beginners was contributed by Brian Wright — POLTERGEIST on Delphi. "If you know someone who wants to get started with OS-9 Level I or Level II, list the file named `Helpmsg` in the `SYS` directory to your printer and give the person the hard copy. This file pretty much describes the command syntax for all OS-9 utility commands. Also, if your friends want to know more about device descriptors and drivers and other things OS-9, have them take a look at the files in the `HELP` directory on their Level II `Config` disk." Another good tip! Thanks, Brian!

New CoCoBin Standard

Bill Brady, author of the OS-9 terminal program *Wiz*, has upgraded his proposed CoCoBin standard to handle ICONs and AIFs — application information files — supported by *Multi-Vue* and the new *WindInt* manager. We print it here with the hope that its automatic operation will make it easier for everyone to receive and enjoy the many public domain OS-9 fonts, picture files, etc., bound to follow. Brady proposed that a binary protocol be created and that it be defined as follows:

One or more blocks would be sent as a preface to binary — Xmodem — transfers. These blocks shall contain information for the purpose of transferring the FD information, the ICON and the AIF, and for removing the fill at the end of the file transmission. On uploading, the operator will be given a choice of Upload or CoCoBin upload. If CoCoBin is selected, the sending software will preface the actual file data with block(s) that contain the information shown in Figure 1.

All undefined bytes in the block should be set to `$C9`. All sizes are equal to the number of bytes in the data item. ICON = 144 bytes.

It is the intent of this standard to apply, and be usable with, transfer methodologies other than Xmodem — hence the use of offsets. Offsets are relative to the first data byte, not (Xmodem) blocks. It is also the intent of this standard not to preclude compression-decompression "on the fly."

After this block is sent, data transfer will continue in the customary fashion, with the next block labeled as Block 2. If ICON data is present, ICON data may or may not start at Block 2. AIF data can start at any point after the ICON, so the ICON will usually be transferred first, AIF next, starting at the beginning of Block 2.

After all ICON and AIF data is sent, it is recommended that data begin on the next block boundary for Xmodem. However, it may begin at any point.

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and co-author, with Peter Dibble, of* The Complete Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale is a U.S. Coast Guard lieutenant and lives in Rockville, Maryland.*

```
  XMODEM 132  byte Block #1 CoCoBin                          OS9 FD Definition
______________________________________________________________________
Offset
  -3   Xmodem byte 1  SOH (01)
  -2   Xmodem byte 2  Block # (01)
  -1   Xmodem byte 3  Block MOD(256)
   0   Xmodem byte 4  ATTR   byte (usually (07))                FD.ATT
   1   Xmodem byte 5  OWNER msb (usually (00))                  FD.OWN
   2   Xmodem byte 6  OWNER lsb (usually (00))
   3   Xmodem byte 7  YEAR  (87)($57)     Date                  FD.DAT
   4   Xmodem byte 8  MONTH (03)        Last Modified
   5   Xmodem byte 9  DAY
   6   Xmodem byte 10 Hours
   7   Xmodem byte 11 Minutes
   8   Xmodem byte 12 FILE SIZE mmsb                            FD.SIZ
   9   Xmodem byte 13 FILE SIZE msb
  10   Xmodem byte 14 FILE SIZE lsb
  11   Xmodem byte 15 FILE SIZE llsb
  12   Xmodem byte 16 CoCoBin Revision   Xmodem byte MUST be $FE
  13   Xmodem byte 17 Size of filename
  14   Xmodem byte 18-49 File Name (ASCII) Not Pathname or $C9
  46   Xmodem byte 50 Offset to ICON data (Normally 129 in xmodem... 2nd block)
  47   Xmodem byte 51 ICON size
  48   Xmodem byte 52-53 Offset to AIF data
  50   Xmodem byte 54 -55  AIF size
  52   Xmodem byte 56-57  Offset to Start of file data.
  54   Xmodem byte 58-62 reserved for compression flags $00000=not a compressed
file
  59   Xmodem byte 63-130  NOT YET DEFINED ($C9), reserved for expansion of
CoCoBin.
 127   Xmodem byte 131 CoCoBin Revision   byte MOD(256)
 128   Xmodem byte 132 Checksum
```

Figure 1

```
   0   Xmodem byte 4 (attr) must not be 0
   8   Xmodem bytes 12,13,14,15 must not sum to 0
  12   Xmodem byte 16 must be $FF or $FE (revision  byte) FE=this edition
 127    Xmodem byte  131 must be MOD(256) of   Xmodem byte 16
```

Figure 2

This method, although requiring previous knowledge on the operator's part for uploading, is transparent to the host computer.

On downloading, the receiver may know in advance that the file is in the CoCoBin format, or the software may detect the transfer as CoCoBin as shown in Figure 2.

The receiving Xmodem will then decode the file size (which is the most useful piece of information) and use it in the following ways:

a) display to the operator the number of blocks forthcoming in the transmission

b) use the total blocks/received blocks to drive a % complete indicator

c) discontinue writing data to the incoming file when bytes received equals the filesize (FD.SIZ), effectively "stripping the fill"

The software will place the ICON and AIF data in the appropriate directory on the appropriate volume. At this time the author is unsure as to the exact use of ICON and AIF data. If the execute bit is set, the data portion of the file may be placed in the current execution directory.

After this use, the receiving Xmodem shall discard the CoCoBin block — Block #1 — the ICON and AIF data, and save all subsequent blocks/data to the file.

The opportunity exists for other information to be included in the not yet defined bytes of this block. Responses to this proposed enhancement of the Xmodem transfer methodology should be addressed to William L. Brady, 1503-I Flanders Lane, Harwood MD 29776, CIS 70126,267, Delphi WBRADY, GEnie W.BRADY, or 301-952-1761.

This CoCoBin revision will be used in future releases of *Wiz — gWiz —* and various public domain packages released by the author.

Wood Adds Color to *KISSDraw*

Tom Wood at 1973 Fairgrounds Road, Burton, SC 29902, is the first one out of the gate with an addition to *KISSDraw*, our OS-9 shareware programming project. The BASIC09 procedure `KISSColor` listed this month does the work. Wood modified several other *KISSDraw4* procedures to add color. We'll outline his changes here.

Wood beat us to a project we have wanted to do for a long time. He has definitely inspired me to add code that determines if you are running *KISSDraw* in a four- or 16-color window and reacts accordingly. You could really draw some nice pictures with Wood's addition installed in a copy of *KISSDraw* running in a 16-color window. I'll try to make that my next project.

You change *KISSDraw*'s current drawing color by clicking on the color you want in a bar of 16 equally spaced boxes along the bottom of the screen. When you are running in a four-color window — as in all versions of *KISSDraw* to date — only four of the boxes will be colored. A larger box on the left end of the bar always displays the current drawing color.

You can change the current drawing color to any of the 64 hues available on the Color Computer by pointing to the large box, holding down the mouse button and dragging the mouse from left to right. When you release the button, the color value remains at the currently displayed hue.

To use the `KISSColor` procedure, you must modify several of the *KISSDraw* procedures and add a color variable to the type stats in all *KISSDraw* procedures. Changes (Figure 9) required are summarized here:

`KISSdMenu` — add routine to draw colored boxes

`GetKISSMouse` — add check to see if `ButtonEvent.Mouse.AcY>180` and set `InToolBox` to `TRUE` if so

`WhichTool` — add check to see if `mouse.AcY>180` and set `status.color` to `TRUE` if so

`DoEvent` — add `RUN KISSColor(ButtonEvent)`

`KISSDraw4` — add code to set `ButtonEvent.Pointer.Coulor` to `1` and the statement `Run GFX2("color", 1)` so the program always starts with color Number 1

`KISSColor` simply checks `AcX` sequentially from left to right and either changes the current palette value or the current foreground color. `ButtonEvent.Pointer.Coulor` always contains the current drawing color.

"It really looks like *KISSDraw* is headed directly for animation creation," Wood said. "With multitasking and a little sound thrown in, we should be able to beat the other computers to it at this rate — with your object oriented art and some timed sequences and SS.Tone — it's all there."

Thanks for the `KISSColor` procedure, Tom! Who's next?

FHL and *Sculptor* team help OS-9 Users Group

Color Computer OS-9 users stand to benefit greatly from a change in procedures made by Dave Kaleita, the new president of the OS-9 Users Group. Frank Hogg at FHL is now distributing the 56 disks in the group's software library directly.

You no longer need to be a member of the group to buy a disk of programs. And you should now get your disks in a few days, instead of the few months it once took, because your order no longer needs to be sent through the group's notoriously slow mail relay system. The group benefits, too, because FHL pays a royalty fee for each disk mailed.

When a massive undertaking like the OS-9 Users Group Software Library moves from a volunteer effort to a commercial enterprise, many potential problems surface. For example, prospective buyers expect to be told which programs they can find on a disk — and they want an answer now!

On the surface, this doesn't sound like much of a problem. But when you consider the OS-9 Users Group software library features more than 340 programs squeezed onto 56 disks, you begin to get a clear picture of the problem. Even though the group's librarian has divided the programs into categories, it is difficult to keep track of 340+ programs — in both source and binary versions — and all the files that hold the documentation.

In the Users Group's early years, Dave Kaleita kept the information in an RMS database. He then used OS-9's redirection capability to send the output of his RMS report program to a text file. After that, the file was updated using *DynaStar* — an OS-9 word processor.

The information was all available, but it was stored in a format that was almost impossible to search quickly. To solve the problem, Hogg converted the *DynaStar* text file to a *Sculptor* database that could easily be manipulated and maintained. He also added keyword searching so his telephone operators could quickly find the programs his customers wanted.

```
Title: REMOTE      From: SEATON, WM. GLENN
Ver: 1     Lang: ASM.6809      Fmt: SOURCE
Function: "LINKS" USER TO A SPECIFIED REMOTE TERMINAL PATH FOR
COMMUNICATION.
Program Type: COMMUNICATION
Planned for volume #    0  Already used? Y
```

Figure 3

```
REMOTE
SEATON, WM. GLENN
1
ASM.6809
SOURCE
"LINKS" USER TO A SPECIFIED REMOTE TERMINAL PATH FOR COMMUNICATION
-done-
COMMUNICATION
0
Y
-end-
```

Figure 4

```
For each field enter:
name,heading,type&size,format;validation
Type h for help.

Field name must be unique using A-Z a-z 0-9 -- only.
Valid field types are:

a = alphanumeric(maximum 255 bytes)
i = integer(size 1, 2 or 4 bytes)
r = real(size 8 bytes)
m = money(size 4 or 8 bytes)
d = date(size 4 bytes)

Single byte integers are always positive. Data fields may be dimensioned.
Both format and validation list are optional. The validation list may
contain both single values and ranges of values. Examples:

item,Item Code,a12
Unit,,a5;each,gross,doz,box[Heading defaults to name]
description, ,a20[No heading]
stklev,Stock Level,i4,######
price,Sale Price,m4(3),####.##
cat,Category,i1,##;1-10,50,90-99
```

Figure 5

Since we have long wanted to introduce you to the power of today's new fourth-generation databases like *Sculptor*, we asked Hogg to show us how easy it would be to accomplish a rather complex task — managing the OS-9 Users Group software library, for example.

Converting a Database

An example of a record in the original *DynaStar* file is given in Figure 3. Further study of the file reveals that the records contain from one to three lines under Function. It also shows the maximum length of each field in a record.

Hogg's first step was to use the `Umacs` text editor — available from the Users Group Library — to delete words like "Title:" and "From:" from each field. This editor's extensive macro capabilities made the job easy.

Hogg put each field on an individual line and added the line "-done-" before the "Program Type:" field. He also added the line "-end-" between records and added a last line, "-fin-", so he could test for the end of the file. He named the new file `convRecord`. A record in `convRecord` looks like that shown in Figure 4.

After Hogg finished processing the raw *DynaStar* text file with `Umacs`, he had to describe his new data file for *Sculptor*. He used the *Sculptor* `describe` utility to do this job. He named the file containing the description, `disk`. Figure 5 is a snapshot of the help screen displayed by `describe`. To see this screen while running `describe`, you must press H.

Here is how Hogg described the OS-9 Users Group software library file:

```
KEY FIELDS
1:u_title,Title,a20,u

DATA FIELDS
2:u_size,# Sectors,a4,;0-9999
3:u_from,From,a30,u
4:u_ver,Version,a12,u
5:u_language,Language,a16,1
6:u_format,Format,a16,1
7:u_function,Function,a73(3),1
8:u_type,Program Type,a24,1
9:u_volume,Volume #,a2,
0:u_used,Already Used?,a1,u;Y,N
```

Line 1 is the key field. You can define more than one key, but there is no need to do so here. Hogg used the name of the program described in each record for the key. Since he decided that none of the other information in the record was useful as a key, he described the rest of the fields as data.

It's a *Sculptor* convention to use a prefix like `u_` to name the file in which a variable is found. The word `Title` here is the default text string *Sculptor* will use if you don't override it. The `a20` describes a text field containing 20 characters. Hogg's analysis of the data had shown this was the longest field needed. The `u` means to force uppercase on input. Experienced *Sculptor* users suggest it is wise to force either upper- or lowercase on key fields to prevent confusion during a search.

Line 2 is a field Hogg reserved for future use. The data for this field will need to be added manually, because it does not exist in the original database. However, he knew he needed this information later to determine how many programs will fit on a disk.

Notice the end of Line 2. Hogg used a text field instead of an integer here so he would be able to upload his data files after running them through the OS-9 public domain archiving program `ar`. He had learned earlier that `ar` works only with text files, and he hoped to upload the Users Group Software Library file to many computer bulletin board systems. The `;0-9999` at the end of the line means that *Sculptor* will allow only numbers from 0 to 9999. This demonstrates how *Sculptor* does input validation.

Line 5 is unique because it converts uppercase letters to lowercase automatically when it reads a data file. This makes the text easier to read. Line 7 holds the one- to three-line description of the function of each `UG` program. Line 9, the volume number, must be defined as a text field, because an integer field here would default to zero when the field is blank. The field containing the volume number is blank until the program that the record describes has been assigned to a disk in the library.

On describing the data in his new file, Hogg created a program to read the text file he'd prepared with `Umacs` and inserted it into the database. The code in Figure 6 took care of the job.

```
"UGDISKS" FILE CONVERSION TO SCULPTOR FORMAT
!file ug disk

!temp scrline,,i2
!temp done,-done-,a32
!scroll 13,3

+u_title,,4,14
+u_from,,6,32
+u_ver,,7,32
+u_language,,8,32
+u_format,,9,32
+u_type,,10,32
+u_volume,,11,32
+u_used,,12,32
+u_function,,13,6
+done,,18,32
start   scroll 2 : u_function = ""
scroll   : u_function = ""
input u_title-u_format
scroll 1
start1  input u_function
if u_function bw "-done-" then u_function="" : goto start2
if scrline < 3 then scroll : goto start1
input done
start2  input u_type-u_used
insert ug
input u_title
if u_title ct "-END-" then goto start
if u_title ct "-FIN-" then exit
exit
```

Figure 6

```
                        UG DISK FILE MAINT.
                                                 Today's date [        ]

                 Title [                    ]

             # Sectors [     ]
                  From [                               ]
               Version [              ]
              Language [                    ]
                Format [                    ]
          Program Type [                             ]

              Volume # [  ]
         Already Used? [ ]
                              Function
 [ ][
 ]
 [ ][
 ]
 [ ][                                                                    ]

  i=insert   f=find   n=next   p=prev   m=match   a=amend   d=delete   e=exit

                     Which option do you require?
```

Figure 7

Here's what happens when you run this program. First, Hogg has told *Sculptor* to reference a filename `disk` with the word `ug`. He then defined some temporary variables and a scroll window. That done, he set up the screen form and told *Sculptor* where to put each field on the screen.

The heart of the program follows the screen form definition. The first two lines clear the last two lines of the function array. Then, data is input into all of the fields. When a line begins with (`bw`) the string `-done-`, *Sculptor* moves on to the next field. If all three lines are input, a fourth line containing the string `-done-` is ignored. The rest of the fields are then read and inserted into the database.

Since `u_title` forces uppercase, Hogg had to do the `end` and `fin` tests in uppercase. The `ct` means `contains`. You can read the program line like this. If `u_title` contains the string `-END-` then go to the beginning and start again.

You use OS-9's redirection operators when you run this program.

```
OS9: sage convUGdisk <convReport
```

A few minutes after typing this line, Hogg had 339 records inserted into a new database — ready for manipulation. He then let *Sculptor* write a program to manipulate the new database, by typing two lines:

```
OS9:sg disk
OS9:sage disk
```

Sculptor came alive with a screen that looked like the one shown in Figure 7.

Figure 8

```
OS9 USERS GROUP DISKS

!file disk disk

.new code
!file dkey diskkey
new code end

!temp date,,d4
!temp t_u_function, ,i1
!temp BS,,i1
!temp scrline,,i2
!temp scrflag,,i1

!scroll 14,3

+date,Today's date,2,70

.new code
+k_keyword,,5,33
.new code end

+u_title,,4,34
+u_size,,6,33
+u_from,,7,33
+u_ver,,8,33
+u_language,,9,33
+u_format,,10,33
+u_type,,11,33
+u_volume,,12,33
+u_used,,13,33
+t_u_function, ,14,2;#
+u_function,,14,5

        display date
END\
        end

*i=insert
        clear : display date
i1\
        message "Use BACKSPACE to finish inserting"
        input u_title bs = i4
        read disk nsr = i2
        scrflag = 0
        gosub DISPLAY
        error "Already recorded"
        end i2\
        gosub GET_DATA
        if BS then goto i1
        insert disk
        clear : display date
        goto i1

.i4\
.        clear : display date
.new code
i4      goto ik
.new code end

        end

.new code
*ik=K insert
ik      check disk
ik1     message "Use BACKSPACE to finish inserting"
        input k_keyword bs = END
        k_title = u_title
        insert dkey re = ik2
        goto ik1
ik2     error "That key already exists..."
        end
.new code end

*f=find
        clear : display date
        input u_title bs = END
        find disk
        scrflag = 1
        gosub DISPLAY
        end

.new code
*fk=K find
        clear
        input k_keyword bs = END
        find dkey nsr = fk2
        find disk key = k_title fk1     gosub DISPLAY
        prompt "Next match" no = END
        match disk nsr =fk2
        goto fk1 fk2     message "No matching records"
        end
.new code end

*n=next
        next disk
        scrflag = 1
        gosub DISPLAY
        clear k_keyword
        end

*p=prev
        prev disk
        scrflag = 1
        gosub DISPLAY
        clear k_keyword
        end

*m=match
        match disk nsr = m1
        scrflag = 1
        gosub DISPLAY
        clear k_keyword
        end
m1\
        error "No further matching records"
        end

*a=amend
        check disk
        goto a1
a0\
        input u_title bs = END
a1\
        gosub GET_DATA
        if BS then goto a0
        prompt "All correct" no = a1
        write disk
        clear : display date
        message "Record amended"
        end

*d=del

        check disk
        prompt "Are you sure" no = END
        delete disk
        clear : display date
        end

*e=exit
        exit

DISPLAY\
        display u_title-u_used
        scroll 1
D1_u_function\
        t_u_function = scrline
        display t_u_function,u_function
        if scrline = 3 then goto D3_u_function
        scroll
        goto D1_u_function
D3_u_function\
        return

GET_DATA\
        BS = 0
        input u_size-u_used bs = GD1 eoi = GD0
GD0\
        scroll 1
GD_u_function\
        t_u_function = scrline
        display t_u_function,u_function
        input u_function bs = GD1_u_function eoi = GD2_u_function
        scroll
        if scrline <= 3 then goto GD_u_function
        goto GD2_u_function
GD1_u_function\
        if scrline = 1 then goto GET_DATA
        scroll -1
        goto GD_u_function
GD2_u_function\
        return
GD1\
        BS = 1
        return
```

The program *Sculptor* wrote looked like that shown in Figure 8 — almost. Frank added the code between each `new.code` and `new code end` later to give the program the ability to search on a key field.

Hogg's additions work by letting *Sculptor* know about the file `DiskKey` with the command `!file dkey diskkey`. The program will know it as `Dkey`, and it will store keys in 12-character ASCII fields. The keys are followed by 20-character titles. A match in `DiskKey` returns the title for the main database so that any number of keys may be inserted for any title.

> ***"One person using Sculptor can perform a task that required a systems analyst and a gang of programmers several years ago."***

The `+k_keyword,,5,33` adds the keyword field to the screen format at Line 5, Column 33. `ik` inserts a key into the `DiskKey` file after making sure that a record has been selected. Keys are inserted until you type a backspace.

To find a title record, you type a keyword. If a key is found, a search is made in `Disk` using the key `k_title` from the key file. The record is displayed, and the entire process takes less than a second.

That's all it takes to add a sophisticated keyword search to a *Sculptor* program. There are some problems, however. The program above works fine until somebody changes the title in the main file or deletes a record. There are no provisions in the program to change or delete keys when this

```
(* Add to KISSdMenu procedure
(* Now, for the colors!

RUN gfx2("fill",45,181)
RUN gfx2("fill",116,181)
RUN gfx2("color",2)
RUN gfx2("fill",151,181)
RUN gfx2("color",3)

(* That's all you need

(* add this check in the procedure WhichTool
(* following all of the other checks

IF ButtonEvent.mouse.AcY>180 THEN
ButtonEvent.status.color:=TRUE
END
ELSE
ButtonEvent.status.color:=FALSE
ENDIF
END

 (* add this code to DoEvent

IF ButtonEvent.status.color THEN
RUN KISScolor(ButtonEvent)
ButtonEvent.status.color:=FALSE
ENDIF

(* add this code to initialization at start
(* of procedure KISSDraw4

ButtonEvent.pointer.Coulor:=1
RUN gfx2("color",1)

(* add the second half of the IF statement
(* to the code in GetKISSMouse

IF ButtonEvent.mouse.AcX<40 OR ButtonEvent.mouse.AcY>180 THEN
ButtonEvent.status.InToolBox:=TRUE
ELSE
ButtonEvent.status.InToolBox:=FALSE
ENDIF
```

Figure 9: These additions should be made to the existing programs

!!!NEW!!!

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happens. Hogg fixed that problem by rewriting the amend code:

```
*a=amend
        check disk
        goto al a0\
        title = u_title
        input u_title bs = END
        if u_title <> title then flag=2
al\
        gosub GET_DATA
        if BS then goto a0
        prompt "All correct" no = al
        write disk
        if flag = 2 then gosub CHANGE_KEYS
        clear : display date
        message "Record amended"
        end

CHANGE_KEYS\
        rewind dkey
chl     next dkey nsr = ch_return
        if k_title <> title then goto chl
        k_title = title
        write dkey
        goto chl
ch_return\
        flag = 0
        return

CHANGE_KEYS\
        k_keyword = ""
        k_title=title
chl     readkey dkey nsr=ch_return
        read dkey
        delete dkey
        goto chl
```

Hogg then wrote the following code to delete all keys referring to a main record after that record has been deleted. It is almost the same as the amend code, but this time he wrote it in-line rather than as a subroutine:

```
*d=del
check disk
prompt "Are you sure" no = END
title = u_title
delete disk
rewind dkey
next dkey nsr = dl2
if title <> k_title then goto dll
delete dkey
goto dll dl2      clear : display date
end
```

If Hogg had been working with a larger database — or had thought about it sooner — he would have written the Users Group Software Library database program differently. The sequential method used here would be too slow to manipulate huge databases. However, this month we have only set out to show you how one person using *Sculptor* can perform a task that required a systems analyst and a gang of programmers several years ago.

Planning how the data in your various databases interacts is probably the most important step when you start to program with a database language like *Sculptor* — even when you're writing a small program. We'll look at this and a few other database programming considerations next month when we continue to explore the OS-9 Users Group Software Library with this fourth-generation language. Until then, Happy Groundhog's Day! ☐

The listing: KISSColor

```
PROCEDURE KISSColor
 0000      (* Program to select and change colors
 0026      TYPE rodent=Vld,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSt:

            INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLSA,TLSB:BYTE

            ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:

            INTEGER
 0097      TYPE stats=event,InWindow,InToolBox,InMenuBar,line,box,circle

            ,ellipse,bar,arc,fill,text,freehand,patterns,horzlines

            ,vertlines,slantright,slantleft,dots,color:BOOLEAN
 00EE      TYPE cursor=NoCur,arrow,pencil,cross,hourglass,NoIcon,TextBar

            ,Scross,Icon,IconBuff,Coulor:BYTE
 0121      TYPE packet=mouse:rodent; status:stats; pointer:cursor
 013E      TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
 0163      DIM RegisterSet:registers
 016C      DIM callcode:BYTE
 0173      PARAM ButtonEvent:packet
 017C      DIM Currcolor,Covalue:INTEGER
 0187      RegisterSet.a:=0
 0192      RegisterSet.b:=$89
 019E      RegisterSet.x:=ADDR(ButtonEvent.mouse)
 01AF      RegisterSet.y:=1
 01BA      callcode:=$8D
 01C2      Currcolor:=ButtonEvent.pointer.Coulor
 01D0      IF ButtonEvent.mouse.AcX<76 THEN
 01E2        REPEAT
 01E4          RUN syscall(callcode,RegisterSet)
 01F3          Covalue:=INT(ButtonEvent.mouse.AcX/10)
 0206          RUN gfx2("palette",Currcolor,Covalue)
 021F        UNTIL ButtonEvent.mouse.CBSA=0
 0230        END
 0232      ENDIF
 0234
 0235      IF ButtonEvent.mouse.AcX<115 THEN
 0247        ButtonEvent.pointer.Coulor:=0
 0255        RUN gfx2("color",0)
 0265        RUN gfx2("bar",0,180,76,191)
 027C        END
 027E      ENDIF
 0280      IF ButtonEvent.mouse.AcX<150 THEN
 0292        ButtonEvent.pointer.Coulor:=1
 02A0        RUN gfx2("color",1)
 02B0        RUN gfx2("bar",0,180,76,191)
 02C7        END
 02C9      ENDIF
 02CB      IF ButtonEvent.mouse.AcX<185 THEN
 02DD        ButtonEvent.pointer.Coulor:=2
 02EB        RUN gfx2("color",2)
 02FB        RUN gfx2("bar",0,180,76,191)
 0312        END
 0314      ENDIF
 0316      IF ButtonEvent.mouse.AcX<220 THEN
 0328        ButtonEvent.pointer.Coulor:=3
 0336        RUN gfx2("color",3)
 0346        RUN gfx2("bar",0,180,76,191)
 035D        END
 035F      ENDIF
 0361      END
```

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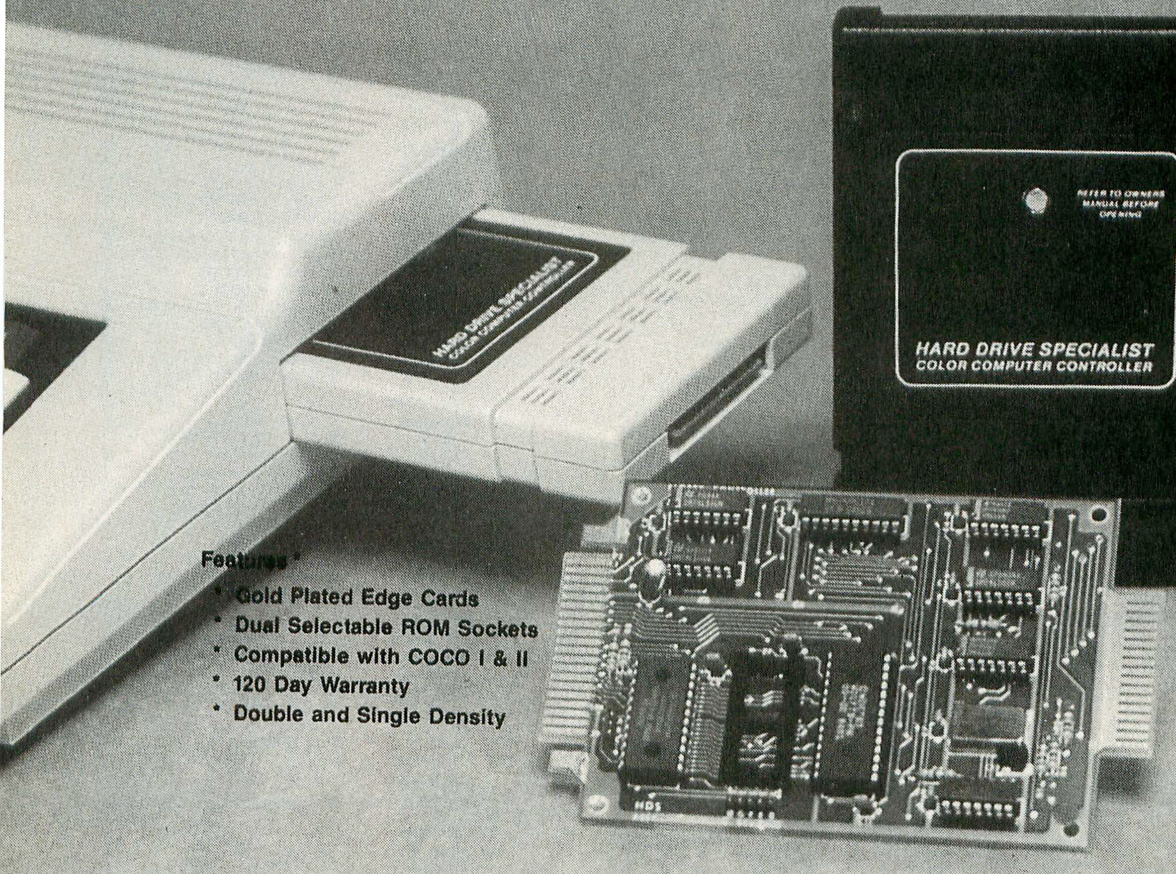
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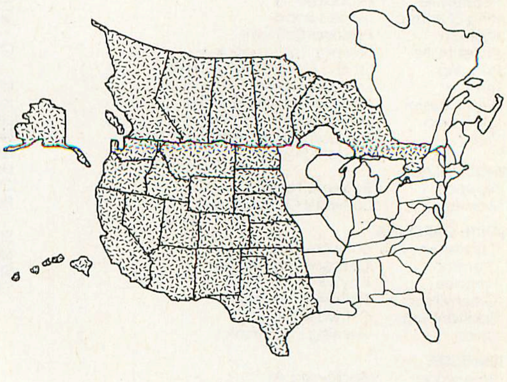

DIGISECTOR DS-69B

NEW

VIDEO DIGITIZER FOR THE COCO 3

(AND ALL OTHER COCOS . . .)

SUPER RESOLUTION !!!

COCO 3 SCREEN

USE YOUR COCO 3 TO ITS FULL POTENTIAL!
Use The Micro Works' DIGISECTOR™ DS-69 or DS-69B and your COCO 3's high resolution graphics to capture and display television pictures from your VCR or video camera. The DIGISECTOR™ systems are the only COCO video digitizers available that accurately capture and reproduce the subtle shades of gray in TV pictures!

- **COLOR:** Add color to your screen for dramatic special effects.
- **HIGH RESOLUTION:** 256 by 256 spatial resolution.
- **PRECISION:** 64 levels of grey scale.
- **SPEED!** 8 images per second on DS-69B, 2 images per second DS-69.
- **COMPACTNESS:** Self contained in a plug-in Rompack.
- **EASY TO USE:** Software on disk will get you up and running fast!
- **COMPATIBLE:** Use with a black and white or color camera, a VCR or tuner.
- **INEXPENSIVE:** Our low price puts this within everyone's reach.

POWERFUL C-SEE 3.3 SOFTWARE

This menu-driven software will provide 5 and 16 shades of gray to the screen and to the printer with simple joystick control of brightness and contrast. Pictures taken by the DIGISECTOR™ may be saved on disk by C-SEE 3.3 and then edited by our optional MAGIGRAPH, or by COCO MAX or GRAPHICOM. This versatile new software is included in both DIGISECTORS™

DS-69B and C-SEE 3.3	**$149.95**
DS-69 and C-SEE 3.3	**$ 99.95**

TRADE IN YOUR OLD DIGISECTOR™
If you already have one of The Micro Works' DS-69 or DS-69A DIGISECTORS™, you may return it to us and we will upgrade your unit to a DS-69B.

UPGRADE DS-69A to DS-69B	**$49.95**
UPGRADE DS-69 to DS-69B	**$69.95**

The DS-69B comes with a one year warranty. Cameras and other accessories are available from The Micro Works.

NO RISK GUARANTEE
If you are not completely satisfied with the performance of your new DS-69B, you may return it, undamaged, within ten days for a full refund of the purchase price. We'll even pay the return shipping. If you can get any of our competitors to give you the same guarantee, buy both and return the one you don't like. We know which one you'll keep.

Purveyors of Fine Video Digitizers Since 1977.

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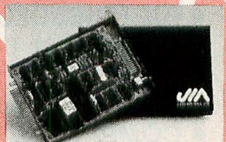
Star NX-10 Printer Only $238
NOW WITH FREE SP-C ($68.45 value)

DISK CONTROLLER
NEW FROM J&M

The DC-4 is a scaled-down version of the popular DC-2 without a parallel port. It includes a switch with 2 ROM sockets, JDOS, manual and such features as gold connectors and metal box. It accesses double sided drives and accepts RSDOS 1.1 for Radio Shack compatability.

$65 DC-4 with memory minder ($2 shipping)



RS DOS ROM CHIP

ROM chip fits inside disk controller. 24 pin fits both J&M and RS controller Release 1.1. For CoCo 3 Compatability.

$25 each Reg. $40 ($2 shipping)

DISK DRIVE SPECIALS

DRIVE 0 +

Howards Drive 0 gives you a DD-3 MPI drive, a CA-1 cable and a J&M DC-4 Disk Controller for only. Add $34 for a Disto DC-3 replacement. ($5 shipping)

$178.45 DOUBLE SIDED DOUBLE DENSITY 360K

Separate Disk Drive Components

DD-3 An MPI 52 double-sided, double density, 360K disk drive in a full height case and heavy-duty power supply.

$98 ($2 shipping) **DRIVE ONE**

TEAC T-3 ½ height, double sided, double density, 720K bare drive, includes all mounting hardware.

NEW $159 ($2 shipping)

TEAC 55B bare drive, ½ height, double-sided, double density with all mounting hardware, needs CA-2 below to fit R.S. 501.

$118 ($2 shipping) **BARE**

SP-C

Serial to parallel converter converts the CoCo 4 pin serial output to run a parallel printer like Star or Epson. Includes all cables. Add $10 for modem attachment.

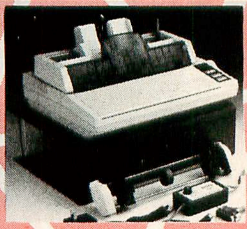
($2 shipping) **$68.45**

CA-1 Cable that connects the disk controller to the drive.

$24.95 One Drive CA-2 **$29.95** Two Drive

GUARANTEE — Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out, test it for compatibility. If you're not happy with it for any reason, return it in 30 days and we'll give you your money back (less shipping).

EPSON
LX-800 $239



Friction and tractor feed included
1 60 CPS
3K Buffer
NLQ on front buttons
Package includes free SP-C serial to parallel converter and Epson tutorial on disk.

Star NX-10 Only $238

FREE SP-C serial to parallel converter while supplies last ($5 shipping)

WORD PACK RS $49

BASIC SCREEN EDITOR $19.95

- Full documentation
- Works on CoCo 1, 2 & 3
- Add lines without renumbering

MYDOS by Chris Hawks $15

- Simplify your directory
- Accesses double sided drives
- Use J&M on CoCo 3

CoCo MAX by Colorware $78.45

- Specify II or III
- Includes high res interface
- Animation
- Printers supported include, R.S. 105, 106, 130: Star: & Epson

($2 shipping on software)

MONITORS

Sony KV-1311CR $449

Regular $625 ($15 shipping)

- Vivid Color
- Vertically flat 13" screen
- Monitor/Trinitron TV with remote control
- 640 X 240 resolution at 15MHZ .37 mm Dot pitch
- RGB analog & digital; TTL; and composite inputs
- VCR inputs
- Cable to CoCo 3 $36

MAGNAVOX 7622 $88

12" Amber Screen offers 900 dots x 350 lines resolution at 20 MHz on a dark glass anti-glare CRT with built-in audio and 1 year warranty.

7652 Green Screen • Same Specs • Same Price

HARD DRIVE

- 20,000,000 Bytes
- equivalent to 125 R.S. 501's on line
- micro stepping heads have 15 position per track
- automatic temperature compensation realigns head every five minutes for trouble free reads and writes
- will also work with IBM & clones
- complete package includes 20 meg drive, case & power supply, controller, and interface that plugs into slot #3 of multipack interface.
- 1 year warranty

$699.00 (5 ship)

BASIC driver lets you access this hard drive without need for OS-9 $49.95.

Howard Medical Computers 1690 N. Elston Chicago, IL 60622

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APO and Canada order slightly higher.

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MISSION: RUSH'N ASSAULT

One or two players can take on the mission to rescue POW'S hidden deep inside enemy territory. Watch out for enemy soldiers, snipers, grenade launchers and many other hazards as you journey farther over enemy lines. Forge your way through jungles and swamps and other hazardous terrain as you search for the missing soldiers. Pick up grenades, extra ammo and more powerful weapons as you continue farther into your mission. The enemy is out in great force to stop your mission. Dozens of screens will keep you playing for hours. Can you succeed and rescue the prisoners? Only time will tell!

Tape or Disk

$28.95 U.S.
$38.95 Can.
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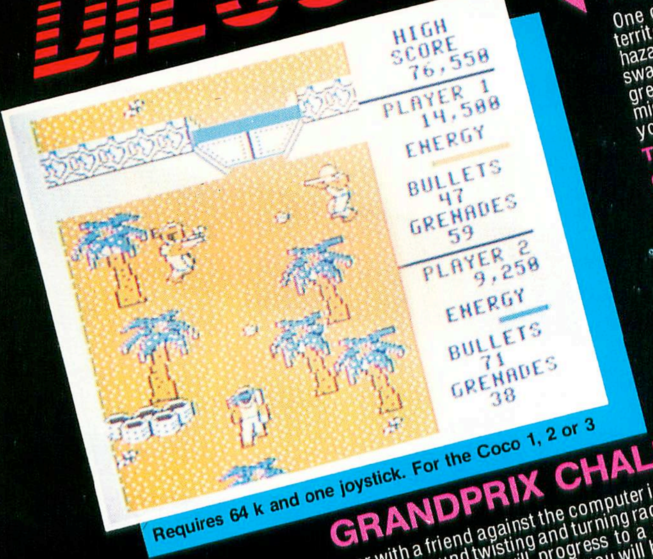

Requires 64 k and one joystick. For the Coco 1, 2 or 3

GRANDPRIX CHALLENGE

Race alone against the computer, or with a friend against the computer in this high speed racing game. You compete in 5 lap races around twisting and turning race courses. Finish the race ahead of all the computer cars and you will progress to a more challenging course. Collect repair tools as you race around the track and you will be able to increase the speed and handling of your race car. But watch out for oil slicks and water puddles on the track or you might find your car crashing into a wall. Detailed 320 × 200 graphics and realistic driving conditions make this a must for your Coco 3 collection. Many different race tracks will keep you challenged.

Tape or Disk **$28.95 U.S $38.95 Can.**
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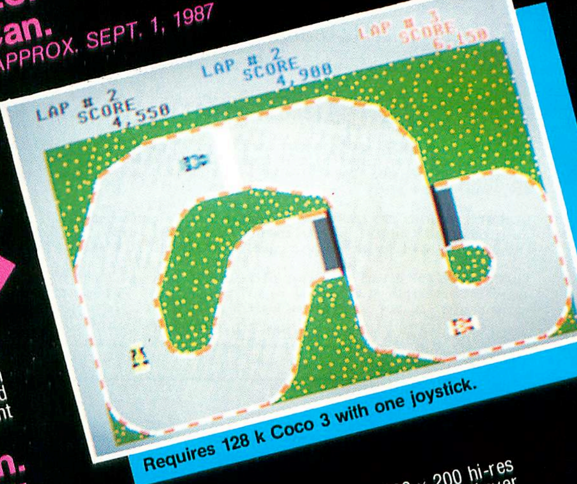
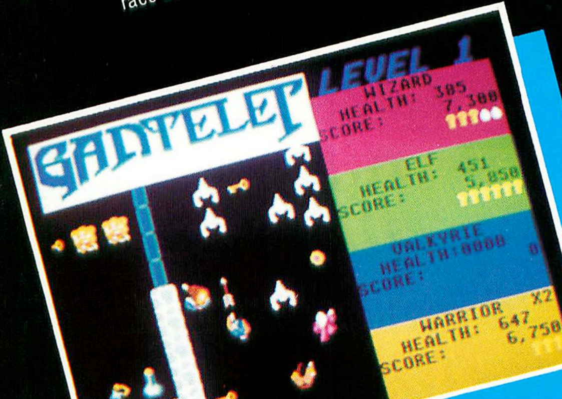


Requires 128 k Coco 3 with one joystick.

GANTELET II

It's back and better than ever. It's Gantelet II for your Coco 3. Using 320 × 200 hi-res graphics with 16 colors, we have created one of the best arcade style games you will ever see for your Coco. Four people can now play simultaneously in one game. Dozens of new levels with new monsters will challenge even the best players. Collect keys to open doors and chests, treasures, and many new magic potions to help you battle more powerful monsters. Watch out for hidden traps as you search for the exit to next level.

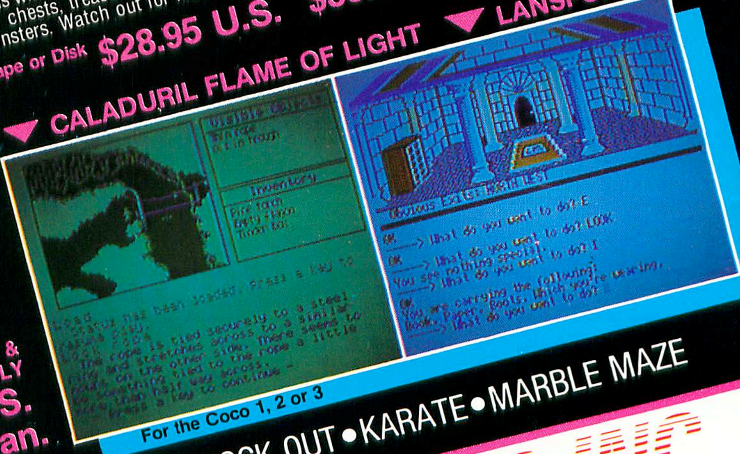
Tape or Disk **$28.95 U.S. $38.95 Can.** *AVAILABLE APPROX. SEPT. 1, 1987*


GANTELET
LEVEL 1
WIZARD HEALTH: 385 SCORE: 7,300
ELF HEALTH: 451 SCORE: 5,850
VALKYRIE HEALTH: 0000 SCORE:
WARRIOR HEALTH: 647 SCORE: 6,750

Requires 128 k Coco 3

CALADURIL FLAME OF LIGHT

LANSFORD MANSION



For the Coco 1, 2 or 3

NEW LOW PRICE ON CALADURIL FLAME OF LIGHT & LANSFORD MANSION, AVAILABLE ON DISK ONLY
$28.95 U.S.
$38.95 Can.

ALSO AVAILABLE: MISSION: F-16 ASSAULT • PAPER ROUTE • KNOCK OUT • KARATE • MARBLE MAZE

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SEE FRONT COVER FOR OTHER DIECOM GAMES

New! from DR. PREBLE'S PROGRAMS

Introducing PYRAMIX

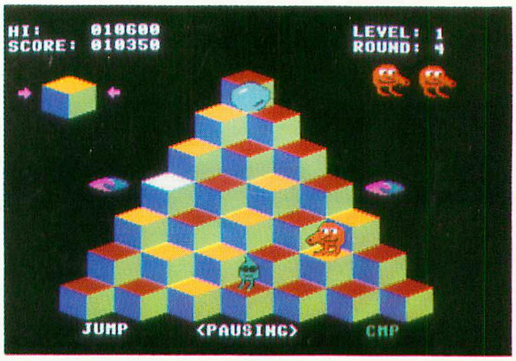
For your Color Computer 3 !

Product of ColorVenture

PYRAMIX is a 100% machine language game written exclusively to take advantage of all the power in your 128K CoCo 3. The colors are brilliant, the graphics sharp, the action hot.

PYRAMIX features the finest in animation, graphics, sound effects and game play available today. It has all the extras you want, too, such as a pause option, RGB and CMP modes, keyboard or joystick play, help screen, multiple skill level, and the ability to backup your disk.

Best of all is the low price! Available today, for only **$24.95 on disk + s/h!**



And Lightning Strikes!

LIGHTNING RAM DISK is the most versatile RAM disk for your **512K** Color Computer 3! LIGHTNING RAM DISK will allow you to use up to 4 mechanical drives and 2 RAM drives simultaneously for a total of 6 Drives! This RAM DISK will also work simultaneously with our amazing LIGHTNING PRINTER SPOOLER! **$19.95 on disk + s/h.**

LIGHTNING PRINTER SPOOLER for the **128K or 512K** Color Computer 3. Multitask your computer! Dump more than 400K of text to the spooler "instantly." Then, continue your keyboard work while it all prints out! Also compatible with our LIGHTNING RAM DISK above. **$14.95 on disk + s/h.**

LIGHTNING BACKUP utility for your **512K** Color Computer 3 reads your master disk once and then makes superfast multiple disk backups on all your drives! No need to format blank disks. Supports 35, 40 or 80 tracks, double or single sided disks and adjustable step rate. **$14.95 on disk + s/h.**

Order all 3 for only $44.95 + s/h

DR. PREBLE'S SINCE 1983 PROGRAMS

Dr. Preble's Prescriptions

Basic Freedom

mental Freedom

BASIC FREEDOM! No one wants to be chained down. And yet, if you type in BASIC programs, you have been subject to involuntary servitude! The culprit? BASIC's limited EDIT command.

Demand Your BASIC FREEDOM! Programmed by Chris BabCock for ColorVenture, this software gives you a **full screen editor** for typing in and editing BASIC programs! Move the cursor anywhere on the screen. Insert, delete or add text. It's the same concept as in a word processor, except you never have to leave BASIC! BASIC FREEDOM is an invisible machine language program which you can turn on and off at will. Even pressing RESET will not hurt your BASIC FREEDDOM! Simple, yet powerful with an easy to read manual. Many extra "nice touches" included, like KEY REPEAT and LOWERCASE INTERPRETER which lets you type BASIC commands in upper or lower case for ease of programming. Translation to uppercase is automatic for commands. Text in quotes is not affected.

For CoCo 1 2 or 3!

SPECIAL COCO 3 VERSION lets you work in 32, 40, or 80 column display modes. A separate version is available for the CoCo 1 and 2. Available on disk for $24.95 + s/h.

MENTAL FREEDOM by Dr. Preble! IMAGINE! Some day, a computer so advanced that it responds to your very thoughts and emotions. Imagine, some day, **thought-controlled** graphics: levitation and materialization! **PLUG IN YOUR MIND and UNHOOK YOUR JOYSTICKS**--that day is now! The Radio Shack Color Computer has many advanced capabilities, just waiting to be tapped. Dr. Preble's Programs combines the advanced technology of the CoCo with the amazing **Radio Shack Biofeedback Monitor** to bring you **"Mental Freedom."**

For CoCo 2 or 3

THOUGHT-CONTROLLED VIDEO CHALLENGE? Unlike any video game you have ever played, our Thoughtware tests your ability to handle stress, to remain calm under adverse circumstances. **LIGHTNING FAST** reflexes will do you no good here, unless you first tame the fickle dragon of your mind. **Are you the secretely nervous type?** Many people can keep a "Poker Face" even when they are worried so that others may not notice; but can you really stop the worry itself? Find out with **Mental Freedom!**

AND IT TALKS! Did you know that the CoCo can produce incredibly realistic digital speech without a special speech synthesizer? The voice quality is so good, it sounds human! Honest. Best of all, no extra hardware is needed for speech, just some clever programming by Dr. Preble.

MENTAL FREEDOM - Next time your friends ask what your computer can do, show them **Dr Preble's Thoughtware!** Requires Radio Shack's Biofeedback Monitor Catalogue #63-675. **Mental Freedom** - DISK only $24.95 + s/h

New!

Vocal Freedom!

512K Digital Voice Recorder for your CoCo 1, 2, or 3!

High Quality Voice Without Synthesizer!

Vocal Freedom lets you ...

- Record voice or any sound into RAM
- Record and playback at 2 speeds
- Save and Load voice to disk
- Select normal or high fidelity
- Record more than 2 minutes of speech if you have a 512K CoCo 3
- Fully compatible with CoCo 1 and 2
- Features **Sound Activated Playback.** Messages will playback automatically for your family when any noise is made. Could also scare off prowlers.

Vocal Freedom includes special cable. Requires only a low cost amplifier (RS cat. #277-1008) and any microphone.

On Disk, only **$39.95 + s/h**

Extra . . . Hacker's Pac!

Incorporate digitally recorded voices or sound into your own programs. Requires **Vocal Freedom**, above.

On disk, only **$14.95 + s/h**

VDOS, the UnDISK: Save multiple programs in memory. Or save multiple graphic pictures in memory. Works with or without a disk. Let's you SAVE, LOAD and KILL stored programs or graphics. DIRECTORY function lists files, gives the start, end and execution addresses of machine language programs and number of free bytes remaining. Own a RAM disk without buying a disk drive! Requires 64K CoCo 1 or 2. Available on tape or disk for $24.95 + shipping/handling.

For CoCo 1 or 2

VDUMP, for the UnDISK: Backup all your UnDISK files to a single tape file for easy reloading A must for VDOS users! On tape for $14.95 + shipping/handling.

VPRINT, for the UnDISK: Paper printout for UnDISK Directory. On tape, $9.95 + shipping/handling.

Disk Directory Dazzler

Dress up your Disk Directory with colorful messages and borders. Create useful help messages. Add that professional touch to your creations! Only $9.95

For CoCo 1, 2 or 3!

CoCoBraille

Emboss Grade 1 or Grade 2 Braille using your CoCo 1, 2 or 3 and a Brother Daisy Wheel printer! Fast Print to Braille conversion algorithm converts word processor files, program listings and data files into **touch readable Braille.** For use by the blind or the sighted. **No knowledge of the Braille code is necessary.** Just send print to the program and out comes Braille! Note: The complex Grade 2 conversion is very good and though not always perfect, quite readable. Requires 64K or more. Brother HR series printer or the IF-50 interface series required. Low Cost! Similar software costs 3 times as much. Only **$49.95 + s/h**

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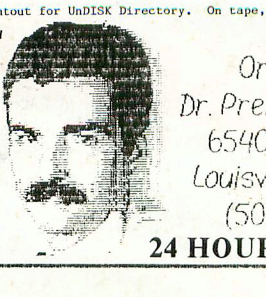

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